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BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

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MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

AITKEN, T. H. G., MAIER, J. & TRAPIDO, H. **The Status of Anophelism and Malaria in Sardinia during 1951 and 1952.** *Amer. J. Hyg.* 1954, July, v. 60, No. 1, 37–51, 4 figs.

The programme for the eradication of *Anopheles maculipennis labranchiae* from Sardinia by ERLAAS [this *Bulletin*, 1954, v. 51, 1019] came to an end in 1950. The present paper reviews in detail the measures taken in 1951 and 1952, to deal with the prevalence of *A. m. labranchiae* and other species of mosquito, and the incidence of malaria. A similar but more modest programme with the same objectives was continued but under divided control. In 1951 some residual spraying was carried out with DDT, a scouting force of 380 people was maintained and larvicidal work was carried out round all known positive breeding places. In 1952 there was a routine application of 2 gm. of DDT per square metre to all man-made structures and grottos in certain areas suspected as positive; a scouting force of 730 was maintained and larvicidal practice continued in positive sectors. *A. m. labranchiae*, which it was known had not been eradicated, was found in 151 sectors in 1950, 86 in 1951 and 75 in 1952, but always in very small numbers and frequently as a single larva.

Other features were that *A. claviger* rapidly multiplied, but that *A. algeriensis* multiplied at a considerably greater rate; it constituted in the three successive years 5 per cent., 32 per cent. and 40 per cent. of all larval collections and appeared to be taking over the breeding places previously occupied by *A. m. labranchiae*. *A. sacharovi*, which had previously been reported in the island but not in recent years, was found again for the first time in 1952, there being 39 positive collections in 11 sectors. Malaria continued to be extremely rare: in 1950 there were 4 reported primary cases of which 1 was confirmed, in 1951 3 primary cases, 2 being confirmed, and in 1952 none. A malariometric survey of 27 villages, previously regarded as among the most malarious, revealed parasite rates in the three years of 0·7, 0·16 and 0·09, the spleen rates being 21, 14 and 18. [The continued

maintenance of these relatively high spleen rates, which might be due to causes other than malaria, merits investigation.] *G. Macdonald*

Sato, H., Hashimoto, S. & Otsuji, Y. **Studies on the Endemic Diseases in Southern Kyushu District.** Transition of the Prevalence of Postwar Malaria Fever over a Period of Five Years in the Nansatsu Area. *Med. Bull. Kagoshima Univ.* 1953, Aug., Special No., 25–32, 2 charts. [12 refs.]

The return of soldiers and civilians to Japan towards and after the end of the war resulted in localized epidemics of malaria which reached their height in 1946 and 1947. The authors studied outbreaks in two districts of the Nansatsu area in the extreme south of Japan. Two of 100 soldiers billeted there in 1945 suffered from malaria contracted elsewhere. There followed a local epidemic in which the identified cases numbered 469 in 1946–47, and 187, 50 and 8 in the three succeeding years. Infection in all cases was due to *Plasmodium vivax*. It is noted that the incubation period was often prolonged and that relapses typically occurred either 1 to 2 or 9 to 11 months after the first attack of fever. Originally the epidemic was localized in the immediately neighbouring community but later became dispersed. The peak of the epidemic in 1946–47 was between July and September but in 1948 it was in May and July. *Anopheles hyrcanus* var. *sinensis* and *A. koreicus* were identified and the former incriminated as the vector on circumstantial grounds. Brief notes are given on clinical aspects of the cases and of changes in serum protein values. *G. Macdonald*

i. South Pacific Commission. Noumea, New Caledonia. **Some Aspects of Malaria in the New Hebrides.** Including a Suggested Programme for the Control of the Disease in the Group [Black, R. H.]. *Technical Paper No. 60.* 1954, May, mimeographed pp. v + 41, 5 maps & 8 figs. [14 refs.] [2s.]

ii. South Pacific Commission. Noumea, New Caledonia. **Malaria in the Trobriand Islands (Territory of Papua and New Guinea).** A Survey, and a Report on Experiments with Totaquine and on Plans for Mosquito Control [Black, R. H.]. *Technical Paper No. 61.* 1954, May, mimeographed pp. vi + 54, 9 maps, 1 diagram & 3 graphs. [19 refs.] [2s.]

i. The New Hebrides is a group of about 80 islands situated between 13° and 20°S. and 166° and 170°E. They are populated by about 48,000 agricultural villagers. The climate is of the tropical-oceanic type with a high rainfall and constant high humidity. Malaria is transmitted by *Anopheles farauti*, the only anopheline in the area, and which here differs from the same species elsewhere in that it is endophilic, commonly resting on the walls of houses after taking a blood meal. Spleen and parasite rates taken in 16 localities are classified by age, degree of splenic enlargement, and species of parasite. Quoting only the 2–10-year age group, 251 children were examined, 43 per cent. having enlarged spleens and 9 per cent. having parasites in the blood. *Plasmodium vivax* was present in 10 films, *P. falciparum* in 4 and *P. malariae* in 9 [some previous observers had failed to find *P. malariae*]. There was much variation in the rates from place to place and it was concluded that endemicity varied from hypo-endemic or possibly non-endemic to holo-endemic. A rough test showed that *A. farauti* was killed when adults were held in contact with surfaces treated with DDT at the rate of 200 mgm. per square foot, and another experiment showed

that DDT applied to water at the rate of half a pound per acre killed larvae. A programme of control is suggested, based on the combined use of regular spraying of all houses with DDT, a dry-season attack on breeding areas and the use of antimalarial drugs for certain groups of the population.

ii. The Trobriand Islands are about 20 in number and situated about 9°S. and 151°E. They are made of coral and have a population of about 9,000 people. *A. farauti* and *A. longirostris* were recorded, the latter being found on two occasions and not having been previously reported. *A. farauti* is exophilic and its breeding places do not conform to the accepted pattern in that it regularly takes to recent water collections whether clear, turbid or brackish. The spleen and parasite rates in the 2–10-year age group were 23 and 19 per cent. in the largest island Kiriwina, 58 and 20 per cent. in the next largest Kaileuna, and 58 and 25 per cent. in the remaining 5 islands studied. The parasite species distribution resembled that of the New Hebrides.

An experiment was made over the course of one year in the value of prophylactic medication with totaquine at an adult dosage of 10 grains daily with corresponding reduction for younger people. The results were discouraging; considerable difficulty was experienced in administration; school absenteeism was unchanged; *P. falciparum* malaria occurred in adults and children who were taking totaquine daily; there was no appreciable difference between the weights of children in the treated and control villages. There was some decrease in the spleen rate in the treated villages without a corresponding decrease in the parasite rate. A scheme for malaria control by larvicidal measures to be carried out by the villagers is outlined. [Endemicities are described in the terminology of the Kampala Conference as holo-, hyper-, meso- and hypo-endemic. It is no fault of the author but of the terminology that the term holo-endemic is used to describe conditions which in fact differ radically from those encountered in Africa where the word was coined.] *G. Macdonald*

Laird, M. *Anopheles* **and Malaria at Aneityum, New Hebrides.** *Bull. Entom. Res.* 1954, June, v. 45, Pt. 2, 279–83. [16 refs.]

The paper adds precision to our knowledge of the distribution of malaria in Melanesia. It is generally stated that in the south-west Pacific, *Anopheles* and malaria are not found east of 170°E. or south of 20°S. To that generalization Aneityum forms a hardly significant exception, for it lies a fraction of a degree south of 20°S. but is malarious. In 1952 the author examined the blood of 45 native islanders, about a third of the total population. He found *Plasmodium malariae* in 5 children who had never left the island and *P. vivax* in two children who had been as far as the island of Tanna, which is known to be malarious. *P. falciparum* was not found in Aneityum. There is no previous record of the quartan parasite in the New Hebrides.

The only anopheline present is *A. farauti.* *P. A. Buxton*

Ureña Hernández, L. & Gañán, D. Paludismo en la República Dominicana. [**Malaria in the Dominican Republic**] *Rev. Med. Dominicana.* 1953, Apr.–May–June, v. 8, No. 2, 66–84, 1 chart.

Malaria is by far the most important cause of sickness in the Dominican Republic. The mean annual number of cases recorded during a recent quinquennium was 78,000 (387 per 10,000 inhabitants). It is probable that

a figure 4 times as great would be more representative of the true incidence. Malaria is hyperendemic in many parts of the territory and where endemicity is lower epidemic malaria is liable to occur from time to time. Climatic conditions are everywhere favourable for malaria transmission.

Four species of *Anopheles* are found, *albimanus*, *grabhamii*, *vestitipennis* and *crucians*. *A. albimanus* formed 87 per cent. of all anophelines taken in mosquito traps and is by far the most important, if not the only, vector. *Plasmodium falciparum* is responsible for 68·5 per cent. of infections, *P. vivax* 24·3, and *P. malariae* 7·2 per cent.

Prior to 1941 antimalaria work was restricted to the administration and distribution of quinine. In that year the Malariology Division of the State Health and Welfare Department was brought into being and more active control measures were taken in hand. A beginning was made in the city of San Cristóbal which had at that time a parasite rate of 85 per cent. and a spleen rate of 48. Minor drainage and other work gave favourable results and the work was extended. In 1944 the U.S.A. came to the aid of the Service. The Inter-American Cooperative Public Health Service supplied personnel and equipment and a large programme of drainage and reclamation work was embarked on. This work entailed the construction of 38,470 metres of canal, 32,648 metres by the Inter-American Cooperative Service between 1944 and 1947, and the remainder by the Division of Malariology in subsequent years. Some of these reclamation schemes are described in detail. A Public Health and Malariological Laboratory was also built by the former.

The large drainage schemes conferred great benefits on the centres of population, of sufficient importance to justify the large expenditure. In 1948 residual spraying with DDT began to be used on an extensive scale and is now the exclusive weapon of the Division of Malariology in its campaign. Where possible the responsibility for the upkeep of the drainage schemes has been transferred to local authorities. Small remote rural populations are now protected against malaria infection for the first time. In order to cover the whole country the personnel employed in spraying work is being greatly increased and control decentralized. *Norman White*

Brumpt, L. C. & Vũ-Công-Hòe. Contribution à l'étude du cycle sporogonique du *Plasmodium falciparum*. [**Study of Cycle of Sporogony in** *Plasmodium falciparum*] *Extrême-Orient Méd.* Hanoi. 1952, Oct.–Dec., v. 5, No. 3, 74–80.

A woman aged 25 from North Viet-Nam was examined by the authors, after suffering from *P. falciparum* malaria for 8 days. Blood films showed that 30 per cent. of the erythrocytes contained asexual parasites; on the following day 11 per cent. were parasitized; and on the next, 4 per cent., by which time a few young gametocytes were present in the blood and more in the bone-marrow. The interest lies in the appearance of the parasites on the second day of observation, when "gamonts" were seen. [A "gamont" is a parasite which is destined to give rise to gametocytes, and the authors homologize the forms described here with the gamonts of *Theileria parva*.] The youngest gamont is a spherical body with one nucleus and contains pigment; with growth, the nucleus expands into a body consisting of 6–8 pieces of chromatin arranged symmetrically, and the erythrocyte becomes shrunken, decolorized and studded with Maurer's clefts. In the next stage the nucleus divides into 2 and finally into 4 pieces; at the same time, the cytoplasm assumes the form of a crown, in

the centre or side of which lies the pigment. The corpuscle always remains much deformed. Only one mature gamont was seen—this consisted of 4 *Toxoplasma*-like bodies, of which 2 were crescentic with pointed ends and were assumed to be males, and the other 2 were more stumpy and were assumed to be females. *P. C. C. Garnham*

COVELL, G. **A Note on Protracted Incubation and Late Relapse in Vivax Malaria.** *J. Trop. Med. & Hyg.* 1954, July, v. 57, No. 7, 151–3. [19 refs.]

Two patterns of incubation period and relapse are described in *P. vivax* malaria; in one renewed activity tends to occur 8 to 10 weeks and between the 30th and 40th weeks after the primary attack, and incubation is commonly protracted, delaying the primary attack until the normal time of late relapse. In the second pattern protracted incubation and late relapse are unknown. It is commonly said that the former is common in temperate countries and the latter in tropical ones [this *Bulletin*, 1954, v. 51, 460]. The data on distribution are reviewed and it is concluded that the only strain positively proven to follow the second pattern is the Chesson strain from New Guinea, while the first pattern may be a characteristic of *P. vivax* strains throughout the world excepting only the South-west Pacific region. [See also Covell's comment, as reviewer, in the abstract quoted above, p. 461.] *G. Macdonald*

See also p. 1304, ROZEBOOM, **Hybridization among Mosquitoes and its Possible Relation to the Problem of Insecticide Resistance.**

GELFAND, H. M. **The Anopheline Mosquitoes of Liberia.** *West African Med. J.* 1954, June, v. 3 (n.s.), No. 2, 80–88, 5 figs.

The first part of this paper consists of keys for the identification of females and larvae of 18 species of *Anopheles*, 15 of which are known to occur in Liberia and 3 others which though they have not yet been collected there, probably occur. The main characters used in identification are illustrated.

The second part contains notes on the biology of the species. *Anopheles funestus* and *A. gambiae* are of importance as vectors of malaria throughout Liberia, *A. melas* and *A. nili* are of local importance in some parts of the country; these 4 species are frequently found resting in houses. *Anopheles hancocki*, *A. hargreavesi*, *A. paludis*, *A. pharoensis* and *A. pretoriensis* are of importance in other countries, but the remaining species which do not often rest in houses are not considered to be of significance in malaria transmission.

Some notes are given on the preferred breeding places of the different species and the problem of *A. gambiae* and *A. melas* is discussed. *A. gambiae* occurs throughout the country but *A. melas* is confined to coastal regions.

Larvae of the two species may be distinguished by the character of the pecten but the salinity test is more reliable. Larvae are placed in 37·5 per cent. sea water for 24 hours and an equal number are placed in water from the breeding place. After that time those remaining alive in the 37·5 per cent. solution are transferred to 75 per cent. sea water for a further 24 hours. In a *melas* collection most larvae should survive but most *gambiae*

larvae will die in the 37·5 per cent. solution and all will die in the 75 per cent.

It is not possible to differentiate certainly between females of the 2 species. The 4-banded appearance of the palps is not reliable in Liberia. The only way to make a positive identification is still to keep gravid females until they lay eggs and then identify the latter. *H. S. Leeson*

Merucci, L. Alcune specie di anofeli trovate in varie località dello Yemen (Arabia Sud Occidentale). [**Some Species of Anophelines found in Different Localities in Yemen (South-West Arabia)**] Estratto dagli Atti I. Congr. Interregion. Estafricano, Asmara, 30 mar.–5 apr. 1952. *Boll. Soc. Ital. di Med. e Igiene Trop. in Eritrea.* Special Number. pp. 206–11. English summary (3 lines).

Brief notes are given on the following species of *Anopheles* so far observed in Yemen: *Anopheles cinereus, culicifacies* var. *adenensis, dthali, gambiae, pharoensis, pretoriensis, sergenti, turkhudi.* Data on altitudes and localities are summarized in a table. *H. S. Leeson*

Gillies, M. T. **Studies of House Leaving and Outside Resting of** *Anopheles gambiae* **Giles and** *Anopheles funestus* **Giles in East Africa. I.—The Outside Resting Population.** *Bull. Entom. Res.* 1954, June, v. 45, Pt. 2, 361–73, 5 figs. on pl. [25 refs.]

The author finds that the question whether *Anopheles gambiae* and *funestus* rest inside houses or outside has been studied in several parts of Africa with results which are not always in agreement. Some of this may be due to differences between fresh-water and salt-water forms of *gambiae*, which differ from one another in choice of resting place. But even if the salt-water forms are excluded it will be found that adult *A. gambiae* have been caught resting outside houses in several parts of Africa: in other parts none have been found except perhaps newly emerged individuals.

The work here described was carried out over a period of 20 months in a village inland from Tanga, Tanganyika, at an altitude of about 600 feet. A large amount of time was given to searching for adult mosquitoes in natural resting places outside houses, but relatively small numbers of *A. gambiae* and *funestus* were found. It was observed that the places in which they rest were always marked by two layers of shade, high shade from trees or bushes, and what one might call a strictly local shade from the overhang of a bank or something of that sort. Work was also carried out with artificial shelters: these consisted of rectangular wooden frames covered with plastic gauze, sunk in an earth bank with the entrance partly covered by a black curtain leaving an open gap along the bottom. The catch of female anophelines per shelter per day varied from 0·3 to 3. Some of the shelters were within 20 yards of occupied houses, others as far as 200 yards or even more from any house.

Over a period of many months some 600 female *A. gambiae* and 1,300 female *A. funestus* were captured in the artificial shelters. They were classified according to the ovarian stages defined by Christophers and results tabulated as follows:—

gambiae unfed 33 per cent.; fed 7·5 per cent.; gravid 60 per cent.
funestus ,, 42 per cent.; ,, 7 per cent; ,, 51 per cent.
(These figures include a small percentage derived from natural sites.)

It has previously been shown that in this region the gonotrophic cycle occupies two days, except during a brief, cool season [this *Bulletin*, 1953, v. 50, 903]. The author interprets the above figures by saying that the fed and gravid categories represent the first and second days of a cycle: he concludes that few females leave the house immediately after feeding, but that many do so during the second half of the cycle. This accounts for the rise in those caught outside from about 7 per cent. "fed" (*i.e.*, first day) to about 50–60 per cent. "gravid" (*i.e.*, second day). The author is cautious and admits the possibility that his artificial shelters may be competing with the houses, and that the mosquitoes he catches may represent those which flew out during the night, but would have re-entered the house at dawn. This criticism applies less to some of his shelters which were as far as 200 yards from any house in well-vegetated country. After looking carefully into the matter he concludes that the artificial shelters which are far from a house give a valid sample of the population which would be resting outside houses.

Taking only those mosquitoes caught in shelters far from the houses, or in completely natural spots, it was found that all the 31 *gambiae* and nearly all the 73 *funestus* had fed on man. The author points out, however, that in his area cattle are absent, domestic animals in general few, and wild animals very rare, so that it remains quite possible that non-human hosts may be important in other parts of Africa.

By examining the shelters soon after dawn and again in the middle of the morning, it was shown that something like one-third of all the anophelines move into them after 7 a.m., *funestus* somewhat later than *gambiae*.

In a neighbouring village, children often ate their evening meal outside the house and people were moving about until about 9 p.m. or even later. It was found, however, that *gambiae* and *funestus* seldom fed on man outside the house and that practically all the biting took place after 8.30 p.m.

In reviewing his work the author calls attention to the great difficulty that he and others have found in discovering many *A. gambiae* or *funestus* resting in completely natural resting places. He can find no support for the view that there might be distinct populations, one of them strictly domestic and the other tending to rest outside houses. *P. A. Buxton*

Gillies, M. T. **Studies in House Leaving and Outside Resting of *Anopheles gambiae* Giles and *Anopheles funestus* Giles in East Africa. II.—The Exodus from Houses and the House Resting Population.** *Bull. Entom. Res.* 1954, June, v. 45, Pt. 2, 375–87, 1 fig. [16 refs.]

The present paper is to be considered in close relation to the one which precedes it and which has been reviewed above.

The author describes experiments carried out in two specially designed mud huts with thatched roofs. These were solidly built on a cement floor and the space between the top of the walls and the eaves was blocked with mud. Mosquitoes could enter through a line of slit shutters on all sides of the hut just below the eaves. Each hut had 5 windows which could be shuttered or fitted with window traps. The ceiling was low and lined with white cotton sheet. The huts differed in points of detail. Two men slept in each hut.

The author was able to show that a few female mosquitoes left the hut during the course of the night through the shutters. He gives reason for

thinking that the number which do so is between 4 and 8 per cent. both in *Anopheles gambiae* and *funestus*. Moreover, at least in *A. gambiae*, about half of those which leave during the night are newly-emerged females.

In the previous paper it was shown that in a considerable number of *A. gambiae* and *funestus* which leave the house on the second night (*i.e.*, about 24 hours after entering) the ovaries are partly developed. An experiment was designed to test this and it was shown that 43 per cent. of the half gravid *gambiae* were leaving the house: the proportion in *funestus* was very much lower. The same point was examined by the study of mosquitoes caught by sprays in ordinary African houses where confirmation was found for the view that a proportion of both species were leaving the house on the night after that on which they had fed. The proportion was affected by season. The alternative possibility that the reduction in the number of gravid mosquitoes remaining in the house might be due to mortality was looked into. It was concluded that the mortality, at least in the experimental hut, was extremely low.

The author uses the ratio of fed to gravid females in houses to estimate the proportion of fed to gravid females which must be resting outside. He concludes that in the hot season about 50 per cent. of gravid *gambiae* and 30 per cent. of gravid *funestus* must be resting outside. Continuing his argument, which is original and interesting, he concludes that in the hot season when the interval between feeds is two days "the house catches will represent some 70–75 per cent. of the *gambiae* and 80–85 per cent. of the *funestus* population". The argument appears sound; and it appears that the author has made a valuable contribution to the quantitative study of these two insects. *P. A. Buxton*

Iyengar, M. O. T. **Vector of Malaria in Kabul, Afghanistan.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1954, July, v. 48, No. 4, 319–24.

Kabul, 6,000 feet above sea level, which has a severe winter with 4 months with temperatures below freezing point and a low humidity during the short summer, was commonly thought to be free from endemic malaria. The WHO Malaria Team has found a spleen rate of 10·6 among the children, and a sporozoite rate of 0·39 in *Anopheles superpictus* (2,059 examined), which is incriminated as the vector. Active transmission of *Plasmodium vivax* occurs from July to September. In winter the mosquitoes hibernate. In summer they survive the low humidity by resting in rooms, etc., with more favourable microclimates.

Antilarval measures for control are suggested. None of the 6 other species recorded, which included *Anopheles stephensi* and *A. culicifacies* could be shown to play any significant part in malaria transmission in Kabul. *Kenneth Mellanby*

Cook, D. R. **Pictorial Keys to the Mosquitoes of Medical Importance. VI. Philippine Islands.** *Mosquito News.* 1954, June, v. 14, No. 2, 79–82, 2 figs.

These illustrated keys are drawn up to aid in the identification of the adults and larvae of those mosquitoes of medical importance in the Philippine Islands. They follow the same pattern as those already published for other regions. They are so constructed that they separate the important species not only from one another but also from all other species in the same area.

The most important vector of malaria in the Philippines is *Anopheles minimus flavirostris*. The importance to malaria transmission of *A. mangyanus* is still in doubt; *A. filipinae* may also be a vector but neither *A. maculatus* nor *A. leucosphyrus* is known to transmit malaria in the Philippines.

In addition to the above anophelines 31 others are known to occur or are suspected of occurring in these islands and there are also 164 non-anophelines of which only *Aëdes aegypti* and *Aëdes albopictus* are of medical importance—both transmit dengue on the island of Luzon. Urban yellow fever transmitted by *Aëdes aegypti* has never appeared in the Philippines. *H. S. Leeson*

Laird, M. **A Mosquito Survey in New Caledonia and the Belep Islands, with New Locality Records for Two Species of** *Culex*. *Bull. Entom. Res.* 1954, June, v. 45, Pt. 2, 285–93, 12 figs. [12 refs.]

The mosquitoes of New Caledonia have been the subject of several investigations which are confirmed or slightly extended in the present work. The total number of species known is 13, all of them Culicinae. To that list the present author adds *Culex bitaeniorhynchus*. This can hardly have been missed by previous collectors and it is very likely that it has been introduced into New Caledonia since about 1946, perhaps from New South Wales. It has never been reported from any of the islands in the south-west Pacific but it has a wide Australian distribution and is found westwards through the Oriental region and in Africa.

The author spent a period of a week or so collecting mosquitoes in the Belep Islands, a part of the archipelago of New Caledonia and lying to the north-west of the main island. He gives notes on the species of Culicine mosquitoes which he discovered.

Anopheles and malaria are absent from the whole archipelago as has been known for many years. The author confirmed the absence of malaria in the Belep Islands by examining thick and thin blood smears from 170 children, all of them found to be negative. He evidently feels some anxiety, and justifiably, about the possible introduction of *Anopheles farauti* from the New Hebrides into New Caledonia. He also suggests the possibility that the mangrove swamps, particularly in the neighbourhood of Tontouta, the airfield, might become colonized by mosquitoes from similar areas further west and particularly by *Anopheles sundaicus* which is an important vector of malaria. In our opinion his anxiety on these matters is fully justified. *P. A. Buxton*

Moore, R. A., Brass, W. & Foy, H. **Sickling and Malaria.** [Memoranda.] *Brit. Med. J.* 1954, Sept. 11, 630–31.

Allison [this *Bulletin*, 1954, v. 51, 526] published results which suggested that the sickle-cell trait afforded a considerable degree of protection against *P. falciparum*. In view of this the authors have carried out a malaria survey in two tribes with widely differing sickling rates, both living on the Kenya coast: 302 Duruma with a sickle-cell-trait incidence of 10 per cent. and 220 Kambe with one of 34 per cent. were compared. There was no difference in the incidence of malarial infection nor were there significant differences in the incidence of the various species of parasites. There was no difference between sicklers and non-sicklers in the Kambe when the

incidence of enlarged spleens was determined, but there was a negative association between enlarged spleens and sickling in the Duruma. Though this association seems highly significant (a probability of 1 in 70 of being obtained by chance), the authors do not accept it as representing the true facts because of the non-homogeneity of their sample. *H. Lehmann*

Indian J. Malariology. 1953, Dec., v. 7, No. 4, 295–381. **Symposium on Pyrimethamine (Daraprim, 50–63)** [Jaswant Singh, Chairman] held on November 21, 1953, at G.R. Medical College, Gwalior, under the Auspices of Indian Council of Medical Research.

A symposium on pyrimethamine was held at Gwalior, Central India, under the auspices of the Indian Council of Medical Research on 21st November 1953. At this meeting 16 papers were presented and these, together with a critical review by the chairman, Lieut.-Col. Jaswant Singh, occupy a complete number of the Journal of the Malaria Institute of India.

i. Bhami describes the methyl orange method of Brodie *et al.* as modified for the estimation of pyrimethamine by Schmidt, Hughes and Schmidt [this *Bulletin*, 1953, v. 50, 481].

ii. Ramalingaswami and Sriramachari submit a brief preliminary note on the effect on the toxicity of pyrimethamine in the monkey of vitamin B12, which appears to be negligible.

iii. Ray summarizes the results already published of laboratory studies with pyrimethamine carried out at the Malaria Institute of India against *P. knowlesi*, *P. gallinaceum* and *P. berghei* infection, and of field trials with this drug against *P. vivax* and *P. falciparum* infection.

iv. A preliminary note occupying 25 lines of text refers to an investigation by Ray and 5 of his colleagues on the anti-relapse properties of pyrimethamine and primaquine now in progress.

v and vi. Jaswant Singh in collaboration with several other workers claims to have demonstrated synergism between pyrimethamine and quinine against *P. gallinaceum* infection in fowls and *P. falciparum* infection in man. In the *P. gallinaceum* trials 142 chicks were used, and it is stated that when the two drugs were administered concurrently the dose of each could be reduced to 1/64th of the MED (minimum effective dose) without apparent loss of activity. In the *P. falciparum* trials, in which 91 subjects took part, it was found that when the drugs were given concurrently (37 grains of quinine sulphate and 30 mgm. of pyrimethamine) the dosage of pyrimethamine could be reduced by 50 per cent. or the dose of quinine by 25 per cent. without apparent loss of activity.

vii. Jaswant Singh, Misra, Sen Gupta, Ray and Narayandas have investigated the effect of pyrimethamine on the sporogony cycle of *P. gallinaceum*. Mosquitoes fed on fowls with gametocytes in the peripheral blood 2 days prior to or 6 days following drug administration were subsequently found to harbour viable sporozoites. Mosquitoes fed on fowls receiving pyrimethamine in amounts equivalent to 50 mgm. human dose either on the day of drug administration or on the day following did not become infective.

viii. Chaudhuri reports the results of treating 62 patients with *P. falciparum*, *vivax* or *malariae* infection in Calcutta and concludes (a) that pyrimethamine, like proguanil, is slower in action than chloroquine or amodiaquine, (b) that it can terminate acute attacks of *P. vivax* and *P. malariae* malaria but cannot prevent relapse, (c) that it is not suitable for *P. falciparum* infection since it is ineffective in a proportion of cases and may be

followed by early recrudescence and (d) that it may be useful for suppressive therapy in weekly doses of 25 mgm.

ix. Kolekar presents a short note on field trials in Central India in which 30 patients with *P. vivax* malaria received a combined course of pyrimethamine and quinine, the total dosage being 27 grains of quinine hydrochloride and 30 mgm. pyrimethamine over a period of 36 hours. In most cases asexual parasites were cleared from the peripheral blood within 72 hours and no relapse had been detected during an observation period of 2½ months.

x. Khatri and Samuels treated 24 patients with *P. malariae* infection, 7 with pyrimethamine (50 mgm. single dose) and 17 with amodiaquine (0·6 gm. base, single dose). In both groups asexual parasite clearance was attained in 2 to 4 days.

xi. Laha, Singhal and Navani investigated the toxicity of pyrimethamine at the Medical College, Agra. Five persons were given 25 mgm. daily for 3 days and 5 others 75 mgm. in a single dose. No significant change was noted in the total and differential count of leucocytes nor in the erythrocyte sedimentation rate or urine. No toxic symptoms were observed on the first group but in the second there were certain reactions (chiefly intestinal) suggesting that the drug possesses parasympathomimetic properties.

xii. The same authors report the results of treatment with pyrimethamine of 31 patients suffering from acute malaria: Group I: 12 patients (9 *P. vivax*, 3 *P. falciparum*) received 2 × 25 mgm.; Group II: 13 patients 8 *P. vivax*, 4 *P. falciparum*, 1 mixed *P. vivax* and *P. falciparum*) received 3 × 25 mgm.; Group III: 6 patients (5 *P. vivax*, 1 mixed *P. vivax* and *P. falciparum*) received 4 × 25 mgm.

The drug proved effective in all groups, but the clinical response was slow. Toxic reactions similar to those reported in the previous paper were observed in 5 of the patients in Group II and in one of those in Group III.

xiii. Srivastava describes the results of treatment of 48 patients (26 *P. falciparum*, 22 *P. vivax*). Six *P. falciparum* patients with cerebral symptoms were treated parenterally with quinine. Of the remainder, 14 received Resochin (chloroquine), 8 tablets in 2 days, 13 received amodiaquine (3 tablets single dose) and 15 pyrimethamine (2 tablets of 25 mgm. each in one day). Chloroquine and amodiaquine were found effective in both *P. vivax* and *P. falciparum* infection. *Pyrimethamine* was effective in *P. vivax* infection but 2 failures were recorded out of 7 patients with *P. falciparum* infection treated.

xiv. Nair, Ray and Jaswant Singh record comparative trials with pyrimethamine, bromoguanide and proguanil in *P. cynomolgi* infection. The minimum effective dose of the 3 drugs was 1·1, 2·2 and 1·0 mgm., respectively, the quinine equivalent being 20 for proguanil, 9 for bromoguanide and 18 for pyrimethamine.

xv. Jaswant Singh, Nair, Ray and Misra describe the development of resistance to pyrimethamine in *P. cynomolgi* infection under laboratory conditions by treating the parent strain with progressively increasing doses of the drug. Cross-resistance tests showed that a resultant strain was highly refractory to treatment with proguanil, bromoguanide and the active metabolites of these drugs, but not to M3349 (precursor of proguanil), sulphadiazine or chloroquine.

xvi. Nair, Ray and Jaswant Singh tested quinine, proguanil and pyrimethamine on the highly virulent "Nuri" strain of *P. knowlesi* recently obtained from Malaya [this *Bulletin*, 1954, v. 51, 19, 20], using 102 monkeys. The minimum effective dose of quinine was found to be 30, of proguanil 0·2 and of pyrimethamine 0·05 mgm. per kilo body weight, the

quinine equivalent of proguanil being 150 and that of pyrimethamine 600. It was observed that in some monkeys treated with proguanil and pyrimethamine in doses approximating to the MED of the respective drugs, there was a temporary clearance of parasites followed by their reappearance before the cessation of treatment.

[The papers read at this symposium contain little that is new, excepting those recording synergism between pyrimethamine and quinine. These findings are of great interest, but obviously need confirmation from an independent source.] *G. Covell*

Edeson, J. F. B. **The Treatment of Acute Malaria with Azacrin.** *Ann. Trop. Med. & Parasit.* 1954, June, v. 48, No. 2, 160–63.

Azacrin, a recently synthesized acridine compound, has been found effective against *P. falciparum* malaria in West Africa by Bruce-Chwatt and Archibald [this *Bulletin*, 1953, v. 50, 477]. The subjects of the trial here reported were patients in the District Hospital, Tampin, Malaya, suffering from acute malarial attacks. All were of Asian race, and are designated as semi-immunes.

(a) Two patients with *P. falciparum* malaria were given 0·2 gm. Azacrin on the first day followed by 0·1 gm. on each of the next 2 days. Since one of them still showed asexual parasites in the peripheral blood on the 7th day, it was concluded that this dosage was insufficient, and the next 25 patients were given 0·6 gm. on the first day and 0·3 gm. daily on each of the next 5 days. The clinical and parasitological response was satisfactory, but since it is often impracticable to give a 6-day course, 2 other regimens were tried. Twenty-seven patients were given a single dose of 0·6 gm.; one failed to respond and 3 others had an early recrudescence of symptoms. Twelve other patients were given 0·6 gm. on the first day followed by 0·3 gm. on each of the next 2 days. Clinical and parasitological response was satisfactory in all cases. Equally good results were achieved with 40 other patients, each of whom received a single dose of 0·3 gm. chloroquine base.

(b) Only 12 patients with *P. vivax* infection were treated with Azacrin. Of these six received 0·6 gm. in a single dose with one failure. Courses of 0·2 gm. on the first day followed by 0·1 gm. on each of the next 2 days (1 case) and of 0·6 gm. on the first day followed by 0·3 gm. on each of the next 5 days (6 cases) were satisfactory in controlling the infection. Thirteen other patients treated with a single dose of 0·25–0·3 gm. chloroquine base yielded equally satisfactory results.

It is concluded that Azacrin is about as effective for the treatment of acute malaria in Malaya as mepacrine. Both drugs are efficient when given in adequate dosage, but they are not reliable when administered as a single dose, and in that respect they are both inferior to chloroquine and amodiaquine. No toxic effects were observed with Azacrin in the dosage used. It had no apparent action on the gametocytes of *P. falciparum* in the peripheral blood, nor did it prevent the development of the parasite in mosquitoes. *G. Covell*

Sautet, J. Les limites de la lutte antipaludique: l'exemple de la Corse. [**Limits of Malaria Control, with special reference to Corsica**] *Méd. Trop.* Marseilles. 1954, Jan.–Feb., v. 14, No. 1, 95–102.

Professor Sautet recently revisited Corsica, comparing the endemicity of malaria with that prevailing 20 years ago, analysing the effects of control

and discussing its future policy. The control programme appears to have been a mixed imagocidal and larvicidal programme with a variable object of mosquito eradication and malaria eradication. It has caused the virtual disappearance of malaria with a reduction of the parasite rate from 23·4 per cent. to 0·5, 0·1 and virtually zero in 1950, 1951 and 1952, in which last year there was one known case of fresh malaria infection. At the same time there has been a very marked reduction in *Anopheles maculipennis labranchiae* and *A. sacharovi*, which are difficult to find in adult or larval form in many parts of the island.

Despite this brilliant general result reservoirs of parasites continue in a few places difficult to control and in the form of relapse cases from abroad, and prolific breeding of the two vectors is still to be found in some places where they have an exophilic habit. Moreover, the campaign has not caused the expansion of farming hoped for in previously malarious areas; the migration from the countryside continues and in consequence the population in some places remains sparse and control is uneconomic.

The author concludes that the campaign has been of great value, the virtual elimination of malaria must be maintained, the programme of mosquito eradication should be abandoned and there should be a partial discontinuation of control measures in those areas where virtual elimination of malaria has been achieved, a sentinel service being substituted for the present control mechanism. In this way the present costs might be materially reduced. *G. Macdonald*

Christie, M. **The Mode of Action of Oil Solutions of DDT used as Mosquito Larvicides.** *Ann. Trop. Med. & Parasit.* 1954, Mar., v. 48, No. 1, 11–14, 2 figs.

The present investigation is concerned with the first phase of insecticidal action, namely, its entry into the body as opposed to its action within the body. It had been shown with *Anopheles vagus* larvae that DDT acts primarily as a stomach poison and its contact with the spiracular plate is only of slight importance [this *Bulletin*, 1952, v. 49, 1158]. In order further to investigate this point the following experiments were devised. In the first, each of 35 fourth-stage *Anopheles gambiae* larvae was treated separately. The larva was pipetted on to a plasticine pellet on a piece of microscope slide and fixed in place by pins inserted obliquely in the plasticine on either side of the neck. The slide was then placed in a Petri dish and carefully filled with water until the spiracular plate only appeared at the surface. Five per cent. DDT in malariol high-spread, or malariol high-spread alone, was then applied with a micro-syringe at the rate of 1 quart of oil to an acre of water surface. After 2 hours of exposure, the oil was run off the surface carefully and, after washing in 2 changes of water, the larva was transferred to a clean vessel and examined at the end of another 22 hours. All bruised larvae, revealed by a blackening of the thorax at contact points with the pins, were discarded.

Results showed that a complete kill was obtained with 5 per cent. DDT in malariol high-spread. However, there was the possibility that the DDT, accumulated initially on the spiracular plate, might have been transferred to the mouth and thence to the alimentary tract after the exposure period, as it had been noticed before that when free-swimming larvae were exposed to oil films of DDT they used to sink to the bottom and nibble at the comb and spiracular plate as if to clean them. So the second experiment was devised in which the head of the larva was held under water in the end of a

glass tube drawn out to a fine point of such an aperture that the abdomen and the thorax of the larva would pass through under slight pressure, while the head capsule would not. The tube with the imprisoned larva was placed vertically in a jar and the procedure of the first experiment was followed. Again 5 per cent. DDT in malariol high-spread gave nearly a complete kill. This led the author to the conclusion that, at full dosages, larvae can acquire a lethal dose of DDT in oil solution by way of the spiracular apparatus. It still remains to be known whether, in free-swimming larvae, the gut or the spiracular apparatus is the more important route of entry for DDT.

Results are given in 2 tables and for each experiment a figure is drawn to show the method used in constraining the larvae. *G. R. Shidrawi*

Mastbaum, O. **Observations of Two Epidemic Malaria Seasons (1946 and 1953)—before and after Malaria Control—in Swaziland.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1954, July, v. 48, No. 4, 325–31, 1 graph.

The main vector of malaria in Swaziland is *Anopheles gambiae*; in the past, epidemics have been attributed to unusual climatic conditions, principally abundant rainfall, which are particularly favourable for the breeding of *Anopheles gambiae*. In the epidemic malaria seasons (1946 and 1953) under review, there was no marked variation in the total amounts of rainfall or between the monthly distribution of patterns.

In 1945–1946 an extensive clinical and entomological survey was carried out in order to ascertain malaria incidence, the state of immunity of population, and prevalence, behaviour and infectivity of malaria vectors in the territory. Subsequently some 4,000 blood films taken from children, approximately 10 per cent. of whom were babies up to the age of 1 year, were examined annually. In addition, the field staff checked huts regularly in all controlled areas with a " knock-down " insecticide in order to ascertain the presence of vectors. It has been shown that in spite of apparent absence of vectors inside the huts, transmission of malaria, as judged by the occurrence of fresh infections, continues. Since the introduction of adult mosquito destruction by modern insecticides as a control measure, observations on the presence of larvae and adults indicate that *A. gambiae* is driven from and kept out of huts without being actually eradicated from the area. This regular treatment with a residual insecticide of all huts in malarious areas has now been in force for over 3 years and, in some instances, 4 years. The insecticide used is benzene hexachloride in wettable powder form with a gamma-isomer content of 10 per cent.; the methods of application, carried out at 3-month intervals, gave an approximate coverage of 20 mgm. gamma isomer per square foot. Under epidemic conditions this interval had to be shortened to 2 months and a greater area of territory dealt with; in like conditions, missed huts in an area may be a focus of malaria transmission. That an epidemic of malaria was effectively controlled by these measures in the rural ares of Swaziland is shown by the following table of monthly cases of malaria:—

	Nov.–Dec.	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*Total*
1945–46	180	245	204	1,270	2,494	1,350	5,743
1952–53	15	250	224	151	78	46	764

It is obvious that the initial impetus of the epidemic was cut short and the incidence of cases faded instead of increased. The author draws attention to the fact that similar measures were inadequate in the presence

of extensive breeding waters such as occur in rice fields associated with an irrigation scheme.

Parasite and gametocyte rates were as follows:

	Age Group Years				
	0–1	1–5	6–10	11–16	Adults
Parasite rate %					
1945–46 ...	37	75	78	57	42
1952–53 ...	6	11	10	10	22*
Gametocyte rate %					
1945–46 ...	45	38	20	18	6
1952–53 ...	51	30	26	16	20

* not a true reflection.

It would seem that, because of the marked reduction to exposure which has occurred among the rural Swazi population during recent years, the pattern of crescent rates may have changed, and that the older children and especially adults may have shown signs of losing their immunity against the malaria parasite. It was not possible to study and record the intensity of parasitic infection, but the author's personal impression is that parasite infection among adults was very noticeably higher in 1953 than in 1946.

By far the most prevalent species of *Plasmodium* during the transmission season in Swaziland is *P. falciparum*, which in pre-control areas represented 90–95 per cent. of all infections. The remainder, 5–10 per cent., was made up of *P. vivax* and mixed infections of *P. falciparum* and *P. vivax*. In the 1953 epidemic, 98·6 per cent. of all infections were due to *P. falciparum*.

Among an African population of 180,000 the cost per hut per season was 14·9 pence and cost per head of population 12·7 pence. This was for the epidemic year of 1953 and amounted to an increase of 4 pence per head of the total population over the previous non-epidemic year. The general cost of malaria control forms about 1 per cent. of the annual total territorial expenditure. These figures prove that rural malaria control can be carried out at a relatively low cost, and is not a disproportionate burden on the economy of a territory.

In his conclusions, the author feels that the present-day method of rural control of adult mosquitoes will never bring about a complete eradication of *A. gambiae*. Since the aim must be the effective control of transmission of malaria and secondly the reduction to negligible figures of parasitaemia among the rural population, the present lines of control are considered profitable in helping towards this end. It would be foolish indeed at this stage to think of any relaxation of these control methods: *A. gambiae* is far too elusive and potent a vector. *R. Ford Tredre*

Greenberg, J. & Trembley, Helen L. **Infections produced by Mixed Strains of *Plasmodium gallinaceum* in Chicks.** *J. Parasitology*. 1954, June, v. 40, No. 3, 336–40. [17 refs.]

Two artificial strains of *Plasmodium gallinaceum* [this *Bulletin*, 1952, v. 49, 122] were mixed (in doses of 5 million parasites of each) and inoculated intravenously into chicks weighing 45 to 60 grammes. Strain BI had been maintained exclusively by blood passage; when transmitted by sporozoites, it gives rise exclusively to exo-erythrocytic infections which are always fatal. Strain M had been maintained by alternate mosquito-bird passage; it is characterized by its inability to produce late exo-erythrocytic forms. The resultant infection showed 70 to 80 per cent.

parasitaemia, and on the fifth day *Aëdes aegypti* mosquitoes were fed on the infected birds. Sporozoites developed and when these were inoculated into new chicks, the infection showed the qualities of both strains: exo-erythrocytic stages were present and also blood forms. Mosquitoes were again fed, sporozoites developed and when these were inoculated into new birds exclusively erythrocytic infections developed. A further mosquito passage had the same result. [These findings could be interpreted as being due to a simple mixing of the two strains, but the authors wonder why hybridization did not occur. Possibly an answer to this question might have been elicited if the product of the first mixture had been "crossed" with M and BI respectively and the subsequent infections studied.]

P. C. C. Garnham

Greenberg, J., Trembley, Helen L. & Coatney, G. R. **The Effect of Pyrimethamine on the BI Strain of** *Plasmodium gallinaceum*. *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 665–71. [12 refs.]

It has been shown earlier by the authors that pyrimethamine prevented infection in chicks inoculated with sporozoites of *P. gallinaceum*, although it failed to eradicate an established blood infection [this *Bulletin*, 1954, v. 51, 354]. In the latter case death from tissue forms was prevented and the manner in which the drug acted has now been investigated in a strain of *P. gallinaceum*, which on mosquito passage gives a wholly exo-erythrocytic type of infection with the early death of the host. Week-old chicks of weight 45 to 55 gm. were used and infected by blood and mosquito bite with the particular strain mentioned [this *Bulletin*, 1951, v. 48, 620]. The drug was given orally by catheter, and blood smears were examined from the 8th till the 23rd day after infection with sporozoites, and from the day after inoculation with blood till the twentieth day. Brain smears were regularly examined at autopsy. In order to find when pigmented parasites appeared in treated birds, 5 chicks were inoculated with sporozoites and served as blood donors for inoculation of fresh chicks.

The resulting data indicated that multiplication of erythrocytic forms was taking place in treated birds but at submicroscopic levels. Tissue forms, on the other hand, were also invariably found at autopsy. It was established that a large dose of pyrimethamine given on the 7th day of a sporozoite-induced infection by the strain in question prevented death from exo-erythrocytic forms, the usual sequel in untreated hosts, thereby giving time for the pigmented forms in the blood to develop. Mosquito re-transmission again resulted in wholly exo-erythrocytic infections when treatment was withheld.

J. D. Fulton

Greenberg, J., Coatney, G. R. & Trembley, Helen L. **Relationship between Time of Administration, Dose, and Prophylactic Activity of Pyrimethamine on Sporozoite-Induced** *Plasmodium gallinaceum* **Infections.** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 672–5.

This investigation deals with an extension of earlier work of the present and other authors on the prophylactic activity of pyrimethamine in *P. gallinaceum* infections of the chick [this *Bulletin*, 1951, v. 48, 872; 1953, v. 50, 386; and above]. Chicks of 45 to 60 gm. were used, the vector mosquito being *Aëdes aegypti*. Drug was given orally by catheter. Blood smears were examined daily from 7 days after inoculation till the 21st day and then twice weekly till the 36th day when the experiments were ended

and brain smears were examined. With rare exceptions all untreated birds died with overwhelming tissue infection. In 32 out of 40 chicks treated with 0·016 mgm. pyrimethamine per gm., the highest dose tolerated, infection was prevented, whereas at a sixteenth of this dosage 39 out of 40 infections occurred. A large percentage of birds treated during the first 3 days with 0·04 mgm./gm. were cured.

The authors summarize their results as follows: "In studying the relationship between time of administration and dose of pyrimethamine against *Plasmodium gallinaceum* in young chicks, it was found that with single oral doses the infection could be eradicated even if treatment was withheld up to and including day 6. A greater percentage of chicks not cured by early treatment died of exoerythrocytic infection than of those not cured by treatment given later." *J. D. Fulton*

Greenberg, J. **The Effect of Analogues of Folic Acid on the Activity of Sulfadiazine against** *Plasmodium gallinaceum*. *Exper. Parasit.* New York. 1954, July, v. 3, No. 4, 351–7. [22 refs.]

Various facts suggest that folic acid may be of importance in the nutrition of the malaria parasite. It has been used in a culture medium for *P. lophurae* by Trager [this *Bulletin*, 1951, v. 48, 130] and is inhibited by certain 2:4 diaminopyrimidines which are potent antimalarials [*ibid.*, 1949, v. 46, 1125] and can also inhibit wholly or partially the activity of chlorguanide [proguanil] or sulphadiazine in certain plasmodial infections. Six analogues of folic acid which were themselves without antimalarial activity have now been tested to find if they affected the antimalarial activity of sulphadiazine. Week-old chicks were used as hosts for *P. gallinaceum*, inoculations being made into the jugular vein with 16×10^6 parasitized erythrocytes. The compounds tested were given in aqueous solutions or in capsules. Treatment was begun a few hours before inoculation and continued twice daily for 4 days. On the day after treatment ended counts were made of the number of parasitized erythrocytes in stained smears. Ten chicks served as untreated controls in each experiment and groups of 5 were given 0·05 mgm. sulphadiazine per gm. body weight along with graded doses of the substance under investigation.

All the compounds tested were able to reverse completely the antimalarial effect of sulphadiazine, except oxyfolic acid. It was found by estimation of the amount of diazotizable amine in the blood of chicks that the considerable amount of folic acid sometimes administered was not converted to any significant extent to *p*-aminobenzoic acid. The author puts forward the view that these analogues of folic acid may effect reversal of sulphonamide by themselves serving as a source of this substance for the parasite. While the relationships between the various compounds mentioned for the malaria parasite are not yet clear, there appears to be no definite proof that folic acid is required by it. *J. D. Fulton*

Ball, G. H. **Prolonged Contraction of Mosquito Digestive Tract** *in vitro* **with Partial Development of Oocysts of** *Plasmodium relictum*. *Exper. Parasit.* New York. 1954, July, v. 3, No. 4, 358–67. [23 refs.]

The author has worked for some years on the conditions under which the gut of an adult mosquito may be maintained alive *in vitro* [this *Bulletin*, 1947, v. 44, 1045; 1949, v. 46, 18]. This may prove of great interest in relation to studies on the development of the *Plasmodium* in the insect's

isolated gut. He here reports that the organ was maintained alive and contracting for as long as 5 weeks in a very elaborate synthetic medium which is added to an equal volume of chicken serum containing a proportion of penicillin. This medium, which evidently supplies some of what is necessary for the mosquito gut, is not sufficient for the development of the oöcysts which grow in it only for 4 or 5 days. After that they cease to become larger and indeed may decrease.

The author states that " Cultivation *in vitro* of adult as contrasted with larval or embryonic insect tissue has not been particularly successful ". He might surely have gone further than that and said that there is no recorded case of a successful tissue culture of an insect (adult or larva), if by that we mean something in which it has been demonstrated that cells divide and multiply. *P. A. Buxton*

TRYPANOSOMIASIS

In this section abstracts are arranged as far as possible in the following order:—African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed*:—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

Anais Inst. Med. Trop. Lisbon. 1952 [publ. 1954], Sept., v. 9, No. 3, 691–1034. Número dedicado ao 1°. Congresso Nacional de Medicina Tropical. Tripanosomíase. [**First National Congress of Tropical Medicine. Trypanosomiasis**]

This number of the Anais comprises papers on trypanosomiasis read at the 1st National Congress of Tropical Medicine held in Lisbon in 1952. An introductory paper by M. A. de Andrade Silva deals with the epidemiology of the Rhodesian form of sleeping sickness in Mozambique. P. A. Buxton follows with a brief review of current work on *Glossina*. A note by G. Neujean describes the changes in the cerebrospinal fluid in the Gambian sleeping sickness. The treatment of human trypanosomiasis is discussed by F. S. da Cruz Ferreira. Vasco Bruto da Costa reviews the history of sleeping sickness and its eradication on the Isle of Príncipe. C. Trincão *et al.* describe the behaviour in culture of cellular elements of the bone-marrow obtained from cases of sleeping sickness. Another paper by the same authors is devoted to the formation and function of blood platelets in this disease. In a short note, G. Neujean discusses the treatment of this disease with Arsobal. In a paper devoted to animal trypanosomiases in Angola, by V. Sousa Dias, a useful summary is given of species of trypanosomes and *Glossina* in other parts of Africa. Animal trypanosomiases and vectors in Portuguese African colonies are also dealt with by F. A. Pires. Two notes by V. M. D'Albuquerque Matos are devoted to the therapy and prophylaxis of bovine trypanosomiases in Angola with antrycide methyl sulphate and prosalt respectively. A new cartographical method for indicating the distribution of tsetse flies is proposed by J. A. Travassos Santos Dias. L. van den Berghe and F. L. Lambrecht record the occurrence in Urundi of *G. morsitans*, from which *T. simiae*, *T. congolense* and *T. vivax* were isolated. F. T. C. Ramalhinho and J. Marques da Silva report the results of tsetse-fly surveys in Ile, Zambesia,

and between the rivers Save and Limpopo respectively. The last-named author also contributes a paper on the control of *G. morsitans* in the region of Govuro, Mozambique, while in another paper, with C. Vilhena, he considers agriculture and animal husbandry in the same region in the light of tsetse control. Lastly, F. Machado Bustamente gives an account of campaigns against Chagas's disease carried out in Brazil. *C. A. Hoare*

Leleup, N. Observations sur la biologie des tsé-tsés de la plaine de la Ruzizi. [**Study of the Biology of Tsetse Flies in the Ruzizi Plain, Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1954, Apr. 30, v. 34, No. 2, 191–202.

Glossina palpalis is the only species of tsetse found in the Ruzizi plain in the eastern part of the Belgian Congo. This paper gives a brief account of investigations into the biology of the tsetse in this area; the results confirm those of other workers on this species. *Kenneth Mellanby*

Lapeyssonnie, L. Les réactions non spécifiques des protides et le benjoin colloidal dans le L.C.R. des trypanosomés et des suspects de trypanosomiase. [**Non-Specific Reactions of Proteins and of Colloidal Benzoin in the Cerebrospinal Fluid in Trypanosomiasis, Actual and Suspected**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 2, 320–31, 1 chart. [11 refs.]

The colloidal benzoin, Takata-Ara, Nonne-Appèlt, Weichbrodt and Pandy reactions were applied to the cerebrospinal fluid in actual and suspected cases of trypanosomiasis. (The reactions are named in decreasing order of sensitivity.)

The reactions are negative and colloidal benzoin is normal in the first stage of trypanosomiasis and in patients considered cured. The reactions are usually normal when the cerebrospinal fluid is doubtful (5–10 lymphocytes per cu. mm. 0·25–0·30 gm. per litre of albumin). The reactions, which are slow to appear, are also slow to disappear after the cerebrospinal fluid becomes normal. In second (nervous) stage trypanosomiasis the reactions are positive and the colloidal benzoin flocculates to the left of the normal zone; the zone is extended. The flocculation curve is often inverted when the trypanosome is present in the cerebrospinal fluid at sampling. *J. H. Birkinshaw*

Torrealba, J. F., with the collaboration of A. Díaz Vázquez, I. Ramos, B. Riccardi & P. A. Torrealba. Otros dieciséis casos de enfermedad de Chagas comprobados en San Juan de los Morros. [**Sixteen Additional Proved Cases of Chagas's Disease in San Juan de los Morros, Venezuela**] *Gac. Méd. de Caracas.* 1954, Mar.–Apr.–May, v. 61, Nos. 3, 4 & 5. 123–47, 1 chart & 4 figs.

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

Stauber, L. A., Ochs, J. Q. & Coy, N. H. **Electrophoretic Patterns of the Serum Proteins of Chinchillas and Hamsters infected with** *Leishmania donovani*. *Exper. Parasit.* New York. 1954, July, v. 3, No. 4, 325–35, 1 fig. [32 refs.]

Various serological tests, largely based on the formation of excess globulin during the course of kala azar have been known for some time. The present authors have presented further data on the electrophoretic analyses of serum proteins in hamsters suffering from *Leishmania* infections with a Sudanese strain of *L. donovani*, as well as some new data on the chinchilla, a rodent of South America, similarly infected. These studies were made on serum dialysed against veronal buffer at *p*H 8·5–8·6 and run in a Klett electrophoresis apparatus in the same buffer at 1·5 to 2°C. In the case of hamsters, pooled serum from 5 to 10 animals was used but each chinchilla provided enough serum for one experiment.

In the hamster the globulin increase was mainly in the *alpha*-2 fraction and the low level of *gamma* globulin would lead one to expect the negative formol-gel and globulin precipitation tests already noted for the hamster [this *Bulletin*, 1949, v. 46, 925]. Hypergammaglobulinaemia was a feature of the serum in the infected chinchilla, but globulin precipitation tests were negative. The hamster late in infection shows a decrease in total protein, but this is less marked in the chinchilla. The decrease in serum albumin and increase in globulin leads to the lowering of the albumin/globulin ratio. The serum protein changes observed in the disease are discussed in relation to pathogenesis. *J. D. Fulton*

Michel, A. Sur un cas de leishmaniose de la bouche observé en Algérie. [**A Case of Oral Leishmaniasis in Algeria**] *Arch. Inst. Pasteur d'Algérie*. 1954, June, v. 32, No. 2, 92–5, 4 figs. on 2 pls. [11 refs.]

Rodríguez M., J. D. & Avilés Nugué, F. Algunas observaciones sobre leishmaniasis cutáneo-mucosa en el Ecuador. [**Muco-Cutaneous Leishmaniasis in Ecuador**] *Rev. Ecuatoriana de Hig. y Med. Trop.* Guayaquil. 1953, v. 10, Nos. 3/4, 35–58, 1 pl. & 24 figs. [33 refs.]

It is thought that cutaneous leishmaniasis has existed for centuries. in pre-Columban times, in Ecuador, evidenced by clay figures made by the Incas, but the first definite account of it is that by Gaspar Vianna in Brazil in 1920. The present article is a general description of the condition, with details of 29 patients whose ages ranged between 5 months and 69 years, a table giving the sex, age, residence, type and localization of the lesions and their evolution. Among the local names for it is "Mountain ulcer". The Phlebotomus vectors named are 7 in number: *P. dysponetus, camposi, leopoldoi, apicalis, gomezi* and *shannoni* in Los Rios province; *leopoldoi, lanei* and *shannoni* in Manabi province, and *leopoldoi* in Guayas province.

Twenty-six showed cutaneous lesions, 14 with a single ulcer, in 3 of whom the ala nasi was affected without involvement of the mucosa; 12 had multiple lesions. A child of 5 months had started to show signs 40 days before, when she was only 3½ months old. About twice as many males were attacked as females; of the 29 mentioned 19 were men and 10 were women who helped their husbands in work in the fields. The pathological anatomy and histology are described but contain nothing new.

H. Harold Scott

Forattini, O. P., Pattoli, D. & Aun, J. R. Algunas observações sôbre o comportamento da *Leishmania brasiliensis* em cães. [**Observations on *Leishmania brasiliensis* in Dogs**] *Arquivos Facul. de Hig. e Saúde Pública Univ. de São Paulo.* 1953, Dec., v. 7, No. 2, 137–55, 5 figs. [27 refs.]

The English summary appended to the paper is as follows:—

"The authors give the results of observations in researches of naturally infected dogs and in the inoculations of these animals by *Leishmania brasiliensis*. Thirty two animals with lesions of several aspects were examined in several endemic regions of Mucocutaneous Leishmaniasis in the States of São Paulo and Paraná (Brazil). In none of these animals it was possible to determine the leishmaniotic nature of the lesion they had. Twenty six young animals were inoculated with recent isolated cultures of the parasite. In eight of them it was possible to observe macroscopic alterations in the inoculated region. Only in two of them it was possible to find the parasite in these lesions. The authors conclude by little receptivity of dogs by *Leishmania brasiliensis* infection and consequently by its little epidemiologic value in these regions of Brazil."

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Ley, H. L., Jr. & Smadel, J. E. **Antibiotic Therapy of Rickettsial Diseases.** *Antibiotics & Chemotherapy.* New York. 1954, July, v. 4, No. 7, 792–802, 3 figs. [50 refs.]

This paper contains a very useful summary of the literature dealing with the results of treatment of the rickettsial diseases by the 3 broad-spectrum antibiotics now in general use.

The remarkable effects of the drugs are shown in the following table which has been compiled from one contained in the paper. The average number of days between the administration of the first dose of each drug and defervescence is shown; the figures in brackets show the number of patients in each group.

Average Duration, in Days, of Fever after First Dose

	(A) Typhus Group Fevers					(B) Q Fever
	Louse-borne	Flea-borne	Mite-borne	Tick-borne		
				American	African	
Chloramphenicol (Chloromycetin)	2 (26)	3 (17)	2 (94)	4 (31)	3 (5)	3 (24)
Chlortetracycline (Aureomycin)	3 (4)	2 (64)	2 (30)	3 (13)	3 (40)	5 (52)
Oxytetracycline (Terramycin)	4 (32)	3 (5)	2 (46)	4 (9)	2 (59)	3 (7)

In the table the authors include boutonneuse fever and African tick-bite fever under the name African tick-borne typhus in accordance with the recommendation of the Study Group of the World Health Organization [see this *Bulletin*, 1951, v. 48, 351] and for the sake of uniformity the reviewer has classed Rocky Mountain spotted fever as American tick-borne typhus.

In another table dealing with the results observed in mite-borne (scrub) typhus the average duration of fever after treatment of the same cases is shown rather differently as 31 hours for chloramphenicol; 25 hours for chlortetracycline and 37 hours for oxytetracycline but the authors also state that the results with each drug were highly satisfactory from the clinical point of view. Similar results were obtained in 5 cases of Brill's disease and in 25 cases of rickettsialpox. No death occurred among the 588 cases in which adequate treatment was given before the terminal stages of the illness.

The dosage schedule considered most suitable for all the three drugs is an initial loading dose of 50 to 60 mgm./kgm. body weight followed by the same daily doses given in 3 or 4 divided doses till defervescence. Side effects such as nausea, vomiting or diarrhoea are said to have occurred with some frequency; when these were a problem smaller and more frequent doses or temporary discontinuance of the drug were resorted to.

References are given to reports of 4 fatal attacks of aplastic anaemia following the administration—usually prolonged—of chloramphenicol. The authors state, however, that there is no conclusive evidence that this drug is more likely than the other two to cause blood dyscrasias, and in any case the risks are regarded as being very small compared with the danger of death from untreated attacks.

The authors discuss the cause of the frequent " recurrence of infection " about a week after the end of short courses of treatment with the antibiotics when these are given early in the attacks of scrub typhus. Among 13 patients treated within 24 hours of the onset 10 recurrences were seen, and among 10 patients treated from the 3rd day there were 7 recurrences, whereas among 15 patients treated from the 5th day there were only 2 and among the other 49 patients treated from the 7th or later days there was none. The suggested reason for the recurrences is that when the treatment is started very early the drugs, whose action is rickettsiostatic, cause suppression of antigen and antibody production before complete immunity has been established so that soon after the completion of the course of treatment there is a renewed multiplication of the rickettsiae and a recrudescence of the illness. The authors suggest that this drawback

could be overcome by giving a short 24-hours' course of the antibiotic about 6 days after the end of the standard course. *John W. D. Megaw*

Kryński, S. & Radkowiak, J. **Further Investigations concerning the Action of Dyes on** *R. prowazeki*. *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1953, v. 5, 69–75. [Also fuller version in Polish 54–63 & in Russian 63–9.]

In an investigation of the action of various dyes on *Rickettsia prowazeki* the organisms in an extract of infected louse gut were destroyed in a few minutes by exposure to methylene blue in a concentration of 1 in 1,000 in saline; the effect was much reduced in the absence of light. Some activity was seen with toluidine blue, Rivanol and eosin were less active, and little or no activity was found with Victoria blue and Congo red. Defatted milk or human serum diluted 1 in 1 were more effective media than saline for maintaining the infectivity of rickettsial suspensions. Exposure to diffuse daylight for 10 hours had no effect on the viability of organisms suspended in milk, and milk and human serum conferred some protection against the inactivating effect of methylene blue and toluidine blue. *D. J. Bauer*

Kryński, S., Kuchta, A. & Becla, E. **The Course of** *Proteus* OX_{19} **Infection in Lice.** *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1953, v. 5, 84–7. [Also fuller version in Polish 76–82, 3 charts. (10 refs.) & in Russian 82–4.]

Twelve-day-old lice were infected intrarectally with a suspension of *Proteus OX19* in the S phase, and the rate of multiplication of the organisms in the gut was determined by plating suspensions of lice made at intervals up to 24 hours after infection. Lice infected initially with more than 10,000 organisms died within 48 hours; with smaller inocula a proportion of the lice survived and the organisms could not be detected after 3–5 days. The growth curve of the organisms in louse gut closely resembled the characteristic curve of growth *in vitro* in a fluid medium, but the final concentration of organisms attained was 10 times higher in the gut. Growth was more rapid in lice which were allowed to feed after infection. Degenerative changes appeared in the intestinal epithelium 6 to 12 hours after infection; the cells enlarged and the nuclei disappeared, and deeply staining spherical bodies with light centres appeared within the cytoplasm.

It is stated that the histological picture is quite different from that produced by the toxin of *R. prowazeki*. [See also this *Bulletin*, 1949, v. 46, 1135]. *D. J. Bauer*

See also p. 1312, (i) Hoffman, *et al.*, **Tests with Pyrethrum Synergists combined with some Organic Phosphorus Compounds against DDT-Resistant Flies;** (ii) Eddy *et al.*, **Louse Powder Synergists. Tests of Synergists with Phosphorus Compounds against the Body Louse increased the Initial Activity 10 Times.**

Combiescu, D., Dumitrescu, N., Russ, M. & Dinculescu, M. Considerații epidemiologice asupra unor cazuri de febră butonoasă ivite în ultimii 41 de ani. Cultivarea Rickettsiei conori şi caracterele tulpinii izolate dintr'un focar autohton de febră butonoasă. [**Epidemiological Observations on Cases of Boutonneuse Fever occurring in Rumania in the last**

41 Years. Culture and Characteristics of a Strain of *R. conori* **isolated in a Local Focus**] *Studii şi Cercetări Inframicrobiol., Microbiol. şi Parazitol.* 1953, Jan.–June, v. 4, Nos. 1/2, 99–107. [12 refs.] French summary.

The authors review the epidemiology of 138 cases of boutonneuse fever seen in Rumania in the last 41 years.

During an epidemic in 1948, they isolated rickettsiae, by yolk-sac inoculation of chick embryos, from the blood of guineapigs inoculated with the blood of patients. The cultural, immunological and pathogenic characteristics of this strain are described. It appeared to conform with those of *R. conori.* *H. J. O'D. Burke-Gaffney*

Combiescu, D.; Dumitrescu, N.; Zarnea, G.; Saragea, A.; Essrig, M.; Ionescu, H.; Dinculescu, M.; Pogorelscaia, B.; Ieniştea, C.; Pop, A.; Banu, I.; Mihai, I.; Dumitrescu, V.; Wassermann, W.; Moisescu, I.; Mira, E.; Vicol, P. Cercetări experimentale şi epidemiologice asupra tifosului pulmonar. I. Mecanismul de transmitere a infecţiei în tifosul pulmonar (febra " Q ") [**Experimental and Epidemiological Studies of Pulmonary Typhus (Q Fever). I. Mechanism of Transmission of Infection of Pulmonary Typhus (Q Fever)**] [Combiescu, Dumitrescu, Zarnea, Saragea, Essrig & Ionescu]. *Studii şi Cercetări Inframicrobiol., Microbiol. şi Parazitol.* 1953, Jan.–June, v. 4, Nos. 1/2, 109–34, 16 figs. II. Studiul comparativ al persistenţei unor *Rickettsii* patogene în sacul vitelin al embrionului de găină conservat la temperatura de + 4°C. [**II. Comparative study of the Survival of Certain Rickettsiae in the Yolk Sac of the Chick Embryo when kept at a Temperature of 4°C.**] [Combiescu, Dumitrescu, Zarnea, Dinculescu & Pogorelscaia]. *Ibid.*, 135–6. III. Cazuri de tifos pulmonar (febra " Q ") în mediu epidemic deschis [**III. Cases of Pulmonary Typhus (Q Fever) in an Epidemic Focus**] [Combiescu, Dumitrescu, Ieniştea, Saragea, Pop, Banu, Mihai, Dumitrescu, Wassermann, Moisescu, Mira & Vicol]. *Ibid.*, 137–44, 1 fig. [27 refs.] French summary.

I. Experiments are described which confirm certain generally accepted hypotheses in connexion with the transmission of Q fever, which the authors prefer to call pulmonary typhus [this name is open to criticism on the grounds that it suggests that pulmonary localization is an essential feature of the disease and that the relationship to the typhus fevers is so close as to justify its inclusion in the same group].

Guineapigs were successfully inoculated by the nasal or tracheal routes with the blood or the tissue suspensions of infected animals. Respiratory infection must be important because certain excretions of reservoir rodents and of vector arthropods can harbour the rickettsiae in a viable state, especially when desiccated soon after being discharged. Guineapigs were readily infected by swallowing infected material, especially milk of infected animals. Milk collected and maintained in aseptic conditions remained infective for at least 45 days, but if allowed to become sour it ceased to be infective within 24 hours. This observation suggested that the drinking of sour milk ought to be encouraged. In an epidemiological study of an outbreak it was found that infection was usually associated with the drinking of unboiled fresh milk.

The passage of the rickettsiae through the placenta was found to be possible just as is the case with *Rickettsia prowazeki.* There was clear epidemiological evidence of the transmission of *R. burneti* through the skin

in natural conditions, and guineapigs could be infected in this way especially when there were lesions [presumably abrasions of the surface].

The tick *Rhipicephalus sanguineus* was found capable of transmitting infection from guineapig to guineapig by biting. Numerous species of arthropods have been found infected in natural conditions and some were experimentally infected by allowing them to bite.

II. Yolk-sac cultures of *R. burneti* kept at 4°C. for 306 and 330 days respectively were still infective and the rickettsiae showed no change in their morphological features even though the yolk-sac tissues were dead. In similar conditions *R. prowazeki* and *R. mooseri* had a much shorter survival period. *R. conori* was virulent and unchanged in appearance for 26 days in these conditions.

III. A short note is added on an epidemic in which the diagnosis was confirmed by radiology and the complement-fixation test (which was also positive at 1 in 40 or 1 in 160 in healthy contacts); one cow, among various animals examined, gave a positive reaction, but the source of infection could not be found. *John W. D. Megaw*

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

Aldighieri, R. Considérations sur l'épidémiologie de la fièvre jaune en Amérique Centrale. [**The Epidemiology of Yellow Fever in Central America**] *Méd. Trop.* Marseilles. 1954, May–June, v. 14, No. 3, 286–301. [20 refs.]

The author reviews the story of yellow fever in Central America since the beginning of the present century. He gives a good, up-to-date account of an interesting series of events but does not, we think, add anything to what has already been published. Figures are given both for Central America (including Panama) and for Mexico. In both of these areas there were large epidemics producing several thousand observed cases in the first years of the century, followed by smaller epidemics. What appeared to be the last recorded case occurred in 1923 in Yucatán, Mexico, and in 1924 (a number of cases) in British Honduras, Guatemala and Salvador. There followed a period in which the application of the protection test gave support to the view that the virus was absent from the whole area. Sawyer and his colleagues [this *Bulletin*, 1937, v. 34, 680], and later Kumm and Crawford [*ibid.*, 1944, v. 41, 123], examined large numbers of sera from several parts of the area and only found positives in adults who might have been infected while there were still evident cases of the disease. Children and young people born since 1925 were consistently negative. To this there was one geographical exception, for positive mouse-protection tests were found by Kumm in the Republic of Panama, particularly in the region east of the canal, *i.e.*, next to Colombia. Some of the material collected in 1936 and 1937 showed that small numbers of children were positive.

The disappearance of the disease from man, or at least from urban human communities, and the fact that except in eastern Panama young people showed no sign of infection, might have been held to show that the virus

was completely absent from the region. This was to be attributed to the campaign against *Aëdes aegypti*.

At the end of 1948 cases of yellow fever in human beings occurred in the part of Panama lying east of the canal. Human cases and deaths were later found west of the canal on the Atlantic coast of the Republic of Panama; then (June 1951) over the border in Costa Rica where a case occurred from which the virus was isolated. The disease spread through Costa Rica, not only along the Atlantic slope but also in two areas on the Pacific side of this Republic. The total number of cases in Costa Rica was considerable, indeed there were 40 autopsies on those who had died of the disease in San José, the capital of the Republic. The disease continued to spread westwards and human cases and deaths occurred in Nicaragua from July 1952. While the disease was spreading through the human community (always in rural areas) there was a more or less simultaneous outbreak among the monkeys, most evident in the howler monkeys (*Alouatta*). Very large numbers of these animals died, apparently of yellow fever, as was evident from the fact that they ceased to be heard howling at sunrise. Though the evidence is somewhat sparse, one is entitled to say that the spread of the wave in man and monkeys was at the rate of some 13 miles per month on an average; it seemed that the wave passed a particular spot in about 2 months.

The epidemiological conditions, both as regards the monkeys and the mosquitoes, are very similar to those more fully worked out in the basin of the Amazon. The epidemic was confined to lowland forests and may suitably be described as jungle yellow fever. It failed to establish itself in the cities because of the elimination of *Aëdes aegypti*.

It is remarkable, in a paper dealing with yellow fever, to see General Gorgas written as Gargas. As so well-known a name can be wrongly spelt, we must not be surprised to see Elton as Eltau, Kumm sometimes, but not always, as Kümm, and Whitman as either Withman or Whithman. The animal referred to as a squinel is what we call a squirrel monkey. There are numerous errors in place names and scientific names.

P. A. Buxton

Manso Soto, A. E., Martínez, A. & Prosen, A. F. Distribución geográfica de *Haemagogus* spp. y *Aedes* (*Gualteria*) *leucocaelenus* en Argentina y Bolivia según materiales de M.E.P.R.A. [**Geographical Distribution of *Haemagogus* spp. and *Aëdes leucocaelenus* in Argentina and Bolivia**] *Universidad Buenos Aires: Misión de Estudios de Patologia Regional Argentina. Publicaciones Nos. 83/84.* 1953, v. 24, 33–41, 2 maps.

RABIES

Bull. World Health Organization. Geneva. 1954, v. 10, No. 5, 703–866. **Rabies.** [Symposium.]

This number of the *Bulletin* is entirely devoted to the subject of rabies and comprises a selection of the papers presented on that subject to the Sixth International Congress for Microbiology held at Rome in September 1953. The papers, grouped according to the field of investigation covered,

furnish, under the following headings, accounts of recent developments in these several fields and in that order: (1) virus research; (2) control of rabies in animals; (3) prevention of human rabies.

Under (1) Koprowski describes the biological modifications of rabies virus resulting from its adaptation to chicks and developing chick embryos, and records the results of the inoculation of animals with this adapted strain. These results indicate that the living chick embryo-adapted Flury virus can be employed both as a vaccine administered prior to exposure to rabies infection and as an adjunct to antiserum in the treatment of animals after exposure.

Under (2) are grouped 7 papers. Of these, one by Johnson provides evidence, based on the results of his laboratory studies, that the immunity produced in dogs inoculated with Flury strain live virus vaccine is at a higher level and of longer duration than that obtained with phenol-treated killed virus vaccine. In three papers, those by Wells, by Kaplan, Goor and Tierkel, and by Adamson, the mass vaccination of dogs with Flury strain live virus vaccine is shown to have resulted in highly immune dog populations in Malaya, Israel and Southern Rhodesia, respectively; the advance in the administrative control of rabies in these territories is acknowledged to have been largely due to the availability of such a safe, active virus vaccine as that prepared from the Flury strain. In a paper by Hell the legislative measures for the control of rabies in Austria are stated; these include the compulsory vaccination of dogs, but the true value of this measure—the vaccine now in use is prepared from Neusatz fixed virus—cannot yet be accurately assessed. Plummer indicates the scope and magnitude of the rabies problem in Canada, now faced with the most extensive enzootic in its history. Control measures vary: in the south, where the reservoir of infection is the dog, control is readily effected by tying up and muzzling; in the north, with immense reservoirs of infection among its wild life, efforts are mainly directed towards a reduction of the wild animal population; in the settled areas vaccination of dogs and cats is also practised. Carneiro states the special problem presented in Latin America by bat-transmission of rabies, describes efforts made to solve the problem by destruction of the vectors and by vaccination of bovines, and considers the suitability of chick-embryo vaccine for such vaccination.

Under (3) are grouped 8 papers, in which prevention of rabies in man is considered from various aspects. Habel provides evidence to show the effectiveness of antirabies serum, used either alone or in combination with a course of vaccine injections—a combination which reduces the number of vaccine injections required and thereby the risks of post-vaccinal paralytic accidents.

Veeraraghavan reports the results in India of treatment with phenolized vaccine and, from a statistical analysis of a parallel series of cases permitting comparison of mortality in treated and untreated persons (Cornwall's method of estimating the value of prophylactic treatment), shows that the results of treatment during 1946–51 with 5 per cent. Semple vaccine are superior to those obtained during the period 1912–24 with 1 per cent. vaccine, the true mortality rates being 0·75 per cent. and 2·9 per cent., respectively. Baltazard and Ghodssi review the results obtained in Iran with the different phenolized killed virus vaccines used there for the treatment of persons severely bitten by rabid wolves, point out the ineffectiveness of such treatment in these cases, and emphasize the need for developing vaccines of high antigenicity from avirulent living viruses. Shaughnessy and Zichis adduce experimental evidence to show that, for the treatment of wounds up to 2 hours after contamination with rabies

virus, Zephiran chloride—a cationic detergent—in 1 per cent. solution applied with cotton swabs is more effective than either fuming nitric acid applied with a glass rod or soap in 20 per cent. solution applied by irrigation. Powell and Culbertson report on the results of investigations they made to determine the value of certain nitrogen-mustard and mustard-like chemicals as inactivators of fixed virus in the preparation of experimental antirabies vaccines. Schwab, Fox and Conwell give an account of experiments carried out to ascertain the immune response in man to intramuscular injection with varying total amounts of from 2 gm. to 20 gm. of chick embryo material infected with high (179th to 181st) embryo passage avianized rabies virus of the Flury strain, and conclude from the results obtained that, while this strain can be employed for human immunization without risk of post-vaccinal accidents, further investigations to determine optimum dosage and time spacing of the inocula are required. Jervis summarizes all available evidence in support of the view that experimental allergic encephalitis in animals and the neuroparalytic accidents occurring in antirabies treatment are identical conditions due to an antigen-antibody reaction; the encephalitogenic factor, probably present in the lipid fractions of the brain substance inoculated, acts as antigen and causes the formation of anti-brain antibodies, which react upon the brain and more particularly on the myelin, producing extensive and multiple lesions within the central nervous system. Avoidance of neuroparalytic accidents could, on this reasoning, be brought about either by the elimination of the encephalitogenic factor or by the use of vaccine which does not contain brain tissue. Meyer, in answer to the question "Can man be protected against rabies?"—the title of the final paper in this number of the *Bulletin*—is of the opinion that, given the widespread application of mass vaccination to dogs and given effective education of the public, human rabies is a disease which is in large measure preventible. *G. Stuart*

Hemmes, G. D. Rabies in West-Duitsland. [**Hydrophobia in West Germany**] *Nederl. Tijdschr. v. Geneesk.* 1954, Aug. 28, v. 98 (iii), No. 35, 2421–30, 2 figs.

The English summary appended to the paper is as follows:—

"The author surveys the development of the hydrophobia epizootic in West Germany, mainly in wild animals. He describes the manner in which the disease is transmitted from animal to animal and to man.

"Animals infected with hydrophobia show changes of behaviour; this may contribute to early recognition of the disease in hitherto non-infected areas. The author discusses the organization of the treatment of presumably infected individuals, and the measures to control the epizootic. In West Germany this is mainly concentrated on the extermination of foxes and instruction of the population."

Sullivan, Thelma D., Grimes, J. E., Eads, R. B., Menzies, G. C. & Irons, J. V. **Recovery of Rabies Virus from Colonial Bats in Texas.** *Pub. Health Rep.* Wash. 1954, Aug., v. 69, No. 8, 766–8, 1 map. [12 refs.]

In the present article the recovery of rabies virus from naturally infected colonial, insectivorous bats in the United States is reported for the first time. From among 200 such bats, collected in the central and south central parts of Texas and tested for rabies by the Texas State Health Department

in November-December 1953, 2 strains of rabies virus were isolated: the first from pooled brain tissue comprising one *Tadarida mexicana*, which contained Negri bodies, and one *Myotis velifer*, which contained no Negri bodies, the second from the brain tissue of a single specimen of *T. mexicana*. The epidemiological significance of finding rabies virus in the common Mexican free-tailed bat (*T. mexicana*) is unknown. The two infected bats were, however, taken in unnatural locations away from the caves and dwellings which form their natural habitat, and it is, therefore, suggested by the authors that these bats, when ill with rabies, may leave their colonies and seek solitude—an altered behaviour which would lessen the chances of spread of the infection.

[Pawan (this *Bulletin*, 1949, v. 46, 254) in Trinidad had already shown that non-haematophagous bats become infected with rabies and infectious to man. Transmission of rabies by such bats is then a possibility, and in this connexion it is noteworthy that the biting of human beings by bats of these species infected with rabies has been recently reported in the United States—in Florida by Venters, Hoffert, Scatterday and Hardy (*ibid.*, 1954, v. 51, 686) and in Pennsylvania by Witte (*ibid.*). In Florida during 1953 rabies virus was recovered from the brains of 6 Florida yellow bats (*Dasypterus floridanus*), one of which had attacked a child, and of one Seminole bat (*Lasiurus seminolus*). Both species are non-colonial, insectivorous, and indigenous to the south-eastern United States. In Pennsylvania the rabies virus was recovered from the brain of a bat (*Lasiurus cinereus*), which had made an unprovoked attack on a woman near Carlisle.]

G. Stuart

Remlinger, P., Bailly, J. & Hadji, A. Contribution à l'étude du virus rabique Flury. [**Studies on the Flury Strain of Rabies Virus**] (Deuxième mémoire). *Arch. Inst. Pasteur d'Algérie.* 1954, June, v. 32, No. 2, 71–86.

[See this *Bulletin*, 1953, v. 50, 1037.]

Remlinger, P., Bailly, J. & Hadji, A. Inoculation du virus rabique Flury au singe. [**Inoculation of a Monkey with the Flury Strain of Rabies Virus**] *Ann. Inst. Pasteur.* 1954, July, v. 87, No. 1, 90–91.

In the main experiment recorded in this paper a 2-year-old *Macacus sylvanus* received in the muscles of its neck 10 cc. of a 1 in 50 emulsion of Flury virus. For 15 days the animal remained without symptoms, but thereafter it showed: on the 16th and 17th post-inoculation days, a distaste for food and a completely altered nature, becoming sullen, dejected and restless; on the 18th day, tremors in its left upper extremity and an uncertain gait; on the 19th day, arched back, bristling coat and generalized tremors; on the 20th day, widespread paralysis, that in the hind legs being complete. On the 21st day the animal was moribund and on the 22nd it died. As is the rule with Flury virus infections, there were no Negri bodies in the Ammon's horn or the cerebellar cortex.

In 3 guineapigs inoculated intracerebrally with 0·3, 0·2 and 0·1 cc., respectively of a 1 in 50 emulsion of bulbar material, symptoms of paralytic rabies showed themselves on the 6th, 7th and 14th days, death ensuing on the 7th, 8th and 15th days respectively. Of 2 dogs inoculated sub-occipitally with the same material, one died on the 14th, the other on the 18th, post-inoculation day, the former of classical paralytic rabies, the latter of *forme*

fruste, an atypical form of rabies not infrequently encountered among dogs dying from this cause. Of 2 rabbits inoculated intracerebrally with the same material, one with 0·5 cc. and one with 0·75 cc., the former remained unaffected, the latter suddenly developed, after an incubation period of 14 days, epileptiform seizures of an extremely violent character, which continued until the animal's death 3 days later. Two guineapigs inoculated intracerebrally with brain emulsions of the latter animal showed symptoms of rabies on the 6th day and died on the 7th. According to the authors, such epileptiform seizures, as a symptom of rabies, have been observed for the first time. *G. Stuart*

Koprowski, H. & Black, J. **Studies on Chick-Embryo-Adapted Rabies Virus. VII. Immunological Responses of Animals to Vaccination with High Egg Passage Flury Strain.** *J. Immunology.* 1954, June, v. 72, No. 6, 503–10. [13 refs.]

The present paper is mainly concerned with the immunizing properties of the high egg passage (HEP) Flury strain of rabies virus in different species of animals. Mice inoculated intracerebrally with dilutions of the virus at its 184th or 187th egg passage level showed in from 7 to 14 days solid resistance against challenge with street virus, a resistance which was maintained till the conclusion of the experiment 90 days later. When administered to mice parenterally, however, the same material in single dosage proved to have no immunizing power and even in multiple dosage failed to evoke a uniform immunity response. In guineapigs no difference was observed between the antigenic power of low (51st) and that of high (178th) egg passage virus. Rhesus monkeys injected intramuscularly with either the 52nd or the 186th egg passage of the virus all developed antibodies, and no difference was noted in their immunogenic response to the low or the high egg passage virus. Dogs injected intramuscularly with 3 ml. amounts of 33 per cent. suspensions of the strain at its 180th or 187th egg passage developed an immunity comparable with that obtained with the low (40th to 50th) egg passage virus ordinarily used for the preparation of canine antirabies vaccine. In calves inoculated intramuscularly with the 185th egg passage of the strain in single doses varying between 3 and 15 ml. per animal a satisfactory immunity was induced, the results with 3 ml. being as good as those with 15 ml. Following the intramuscular administration of a single inoculum of 3 ml. of HEP Flury virus to chimpanzees, an antibody level considered to be adequate for protective purposes was achieved. *G. Stuart*

World Health Organization: Monograph Series No. 23. 150 pp., numerous figs. **Laboratory Techniques in Rabies.** 1954. Geneva: Palais des Nations. [20s.; $3.00; Sw.fr. 12.–.]

This monograph has been prepared with the collaboration of 14 specialists in rabies from various parts of the world, whose names and work will be familiar to readers of this *Bulletin*. Its aim is "to present selected procedures which would be dependable and practicable without sacrificing necessary minimal standards, while being at the same time adaptable to the limited facilities and personnel of many rabies laboratories in different countries". The result is an excellent manual, profusely and beautifully illustrated, well-supplied with references and clearly presented in a very attractive form.

The monograph consists of 5 parts, laboratory diagnosis, vaccine production, potency tests, production of hyperimmune serum and breeding and care of laboratory animals.

The first part describes techniques for collecting specimens and preparing animal tissues, for detecting Negri bodies and preparing specimens for the biological test. It describes histopathological diagnosis, the mouse inoculation and the serum-virus neutralization tests.

The second part describes the preparation of phenolized vaccine from sheep and rabbit brains, of irradiated vaccine and of chicken-embryo vaccine.

The third part describes potency tests for rabies vaccine and factors influencing their standardization and includes descriptions of the Habel test and its modifications, the tests required by the U.S. National Institutes of Health and the potency test in rabbits. The test for chicken-embryo vaccine is also described.

The fourth part gives the methods used in producing hyperimmune serum at the Pasteur Institute in Paris and at the Serum Institute in Toscano, Siena (Italy) and also describes potency tests for antirabies serum.

Finally there is a short chapter on the housing, feeding, breeding and care of animals and means of detecting some infective diseases in them.

The illustrations of techniques of preparation and of microscopical appearances are most admirable and show a wealth of useful detail. The coloured plates of Negri bodies and other inclusions and nuclear changes are of particular excellence. The stages in each technique are clearly set out, often step by step, and the descriptions are supported by appropriate illustrations in close proximity to the relevant text.

In every respect this manual, carrying the weight of authority which it does and yet remaining so readable for the ordinary laboratory worker, will be invaluable to those—particularly those in more remote laboratories—who have for long awaited a comprehensive source of guidance in the laboratory techniques to be used in rabies. *H. J. O'D. Burke-Gaffney*

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

Englesberg, E. & Levy, Judith B. **Production of *Pasteurella pestis* Toxin.** *J. Bacteriology.* 1954, July, v. 68, No. 1, 57–60, 1 fig. [10 refs.]

The authors give details of an improved and simplified method of producing a plague toxin by cultivation of *Pasteurella pestis* in the casein hydrolysate mineral glucose medium described in their paper on the production of the envelope antigen from *P. pestis*, strain A1122 of Jawetz and Meyer [see this *Bulletin*, 1954, v. 51, 914]. P. pestis, strain EV76 of Girard and Robic, which is avirulent and reportedly toxigenic, when grown in this medium at 30°C. yielded a large quantity of plague toxin by the 7th day of cultivation; this is released into the supernatant fluid of the medium, from which it can be precipitated with saturated ammonium sulphate and then subjected to a process of dialysis and lyophilization.

The result is a highly potent toxin 4 to 8 times as much as is yielded by strain A1122 in similar conditions. There is relatively little soluble antigen so that the toxin is available in a comparatively high degree of purity suitable for further attempts at complete purification.

The effects of the toxin are being studied and it appears that death is primarily due to irreversible damage to the capillary wall.

John W. D. Megaw

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Iyer, S. N., Dudani, A., Krishna Murti, C. R. & Shrivastava, D. L. **Effect of Sodium Chloride on the Aspartic Acid Deaminase of *V. cholerae*.** *Enzymologia.* The Hague. 1954, Mar. 15, v. 16, No. 5, 285–8, 2 figs.

"The effect of increasing amounts of sodium chloride on the stability of the aspartic deaminase of *V. cholerae* has been studied and it has been found that the salt has a protective action on the activities of cells and a cell-free enzyme preparation.

"Increasing supplements of NaCl to a growth medium of *V. cholerae* bring down the activity of aspartic deaminase of the organism."

Agarwala, S. C., Krishna Murti, C. R. & Shrivastava, D. L., with the technical assistance of A. Sen Gupta. **Metabolism of Purine and Pyrimidine Compounds by Vibrios.** *Enzymologia.* The Hague. 1954, Mar. 15, v. 16, No. 5, 322–8, 5 figs. [11 refs.]

"The metabolism of eighteen purine and pyrimidine compounds by resting cells of vibrios has been studied and it has been observed that there is very little stimulation of oxygen consumption in presence of these substrates. Adenosine, adenylic acid, cytidylic acid, cytidine and adenosine triphosphate were, however, readily deaminated and the phosphorylated derivatives of the bases were dephosphorylated.

"Factors affecting the deamination of adenosine like pH, substrate and enzyme concentration have been studied. The effect of several activators and inhibitors has been reported.

"From spectrophotometric studies it has been found that adenosine is quantitatively converted to inosine."

Gallut, J. Les éléments du diagnostic bactériologique du choléra. [**Principles of Bacteriological Diagnosis of Cholera**] *Rev. Coloniale de Méd. et Chir.* 1954, Aug. 15–Sept., v. 26, No. 227, 158–64. [12 refs.]

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Brooke, M. M., Donaldson, A. W. & Brown, E. **An Amebiasis Survey in a Veterans Administration Hospital, Chamblee, Georgia, with Comparison of Technics.** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 615–20.

Four hundred ambulatory patients in the medical wards of Lawson Veterans Administration Hospital, Georgia, were examined for *Entamoeba histolytica* and other intestinal parasites including helminths. An average of 2·6 specimens passed after a cathartic per patient were examined (1) by direct wet mounts, (2) by the Ritchie formalin-ether sedimentation process and (3) by the polyvinyl alcohol [PVA] technique of Goldman and Brooke [this *Bulletin*, 1954, v. 51, 117], followed by staining by the method of Tompkins and Miller [*ibid.*, 1948, v. 45, 84]. Specimens from 374 patients were cultured. By these combined methods 9.3 per cent. of patients were found infected with *E. histolytica*, a rate which is within the generally accepted range of incidence of *E. histolytica* in the United States. Four of the 37 (10·8 per cent.) were considered to be suffering from clinical amoebiasis and of these two had probably contracted the infection on war service. Comparison of the techniques employed showed that the PVA-fixative provided a convenient method of collecting specimens for preparation of stained smears. This procedure is especially advantageous for demonstration of amoebic trophozoites, but should be used in conjunction with other procedures that are more effective in the identification of cysts.

Statistical comparison of environmental data revealed a significant relationship between *E. histolytica* infections and outside toilet facilities.

Other findings were as follows: *E. coli* was present in 11·3 per cent.; *Endolimax nana* in 20·3; *Iodamoeba bütschlii* in 2·3; *Dientamoeba fragilis* in 3·3; *Giardia intestinalis* in 3·5; *Trichomonas hominis* in 1·3; *Strongyloides stercoralis* in 0·8; *Ancylostoma duodenale* in 1·7; *Trichuris trichiura* in 0·5; *Ascaris lumbricoides* in 0·3; and *Enterobius vermicularis* in 0·3 per cent.

Philip Manson-Bahr

Baugé, R. Statistiques comparatives de l'amibiase en milieu militaire, et en milieu civil autochtone au Nord Viêt-Nam au cours des trois années 1950–1951–1952. [**Comparative Incidence of Amoebiasis among Troops and the Local Civilian Population in North Vietnam in the Years 1950 to 1952**] *Extrême-Orient Méd.* Hanoi. 1953, Jan.–Mar., v. 6, No. 1, 96–103, 1 chart.

The figures for *Entamoeba histolytica* and for intestinal helminthic infection rates in sick soldiers and in sick civilians in North Vietnam have been recorded month by month over a period of 3 years; 4,819 stool examinations (2,881 on military patients) have been performed to this end. Of the soldiers 20·8 per cent. had *E. histolytica* infections, but only 8·3 per cent. of the civilians were so infected. Monthly fluctuations in the incidences are analysed.

[There is no indication of the number of stools obtained from each patient, and none as to whether any correction to the incidences has been applied.] *A. R. D. Adams*

Eyles, D. E., Jones, Frances E., Jumper, J. R. & Drinnon, Virginia P. **Amebic Infections in Dogs.** *J. Parasitology.* 1954, Apr., v. 40, No. 2, 163–6.

The investigation described in this paper was undertaken in order to determine whether dogs might constitute reservoirs of human amoebiasis. Stool specimens were obtained from the rectum of 143 dogs, which were sacrificed in connexion with physiological experiments and came from Memphis, Tennessee, and its vicinity. The faeces were inoculated in Nelson's medium, examined microscopically in saline and in iodine after concentration, and preserved in polyvinyl alcohol fixative for subsequent staining with haematoxylin. Strains which grew in culture were inoculated intracaecally into rabbits, which were killed and examined for amoebic lesions 2–4 weeks later.

All these methods combined revealed infection with *Entamoeba histolytica* in 12 dogs (8·4 per cent.). The cultural method proved to be the most satisfactory, as growth was obtained in all 12 cases, as compared with 1 positive result by direct examination and 2 in the fixative. No infections were detected by the concentration method, probably owing to the absence of cysts in the dog. The specific identity of *E. histolytica* was verified in stained preparations of cultures, in which typical quadrinucleate cysts were also present. Although the infection in dogs was found to be scanty, in view of the intimate association between these animals and children the occasional transmission of canine infection to human beings is not excluded. It is thought that dogs themselves acquire the infection by ingestion of human faeces.

In addition to *E. histolytica*, *E. coli* was found in 2 dogs, and *Endolimax nana* in one. The former is the second [this *Bulletin*, 1933, v. 30, 387] and the latter the first record of these amoebae in dogs.

C. A. Hoare

Blumenthal, H., Michaelson, J. B. & DeLamater, J. N. **Studies on the Nutrition of *Endamoeba histolytica*. I. Amino Acid Buffers.** *Exper. Parasit.* New York. 1954, July, v. 3, No. 4, 321–4. [16 refs.]

The importance of *p*H in cultures of *E. histolytica* has been shown by a number of authors. In the past phosphate buffers, which may serve as a source of this element for metabolic requirements, have been exclusively used. The present authors have investigated other buffers which might serve equally well. For this purpose, 0·1 molar concentrations of *dl*-alanine, *l*-glutamic acid and *dl*-aspartic acid were used, more on account of their physiological characters than for their buffering powers, to replace the phosphate system in Stone's buffer [this *Bulletin*, 1937, v. 34, 324]. The Denton strain of *E. histolytica* was used, accompanied either by a mixed bacterial flora or by *Bact. aerogenes* alone. Transfers were generally made every 2 days and the experiments, in which phosphate and the 3 other buffers were compared, were continued for 21 to 23 days.

It was found that growth of the *E. histolytica* was satisfactory in presence of the amino acid buffers, in absence of added phosphate other than that naturally present in components of the medium. The *p*H after 2 or 3 days' growth in presence of the amino acids appeared to be largely determined

by the nature of the bacteria present. When the aspartic acid buffer was used it was sometimes noted that growth of amoebae was more profuse in presence of *Bact. aerogenes* alone than when a mixed bacterial flora was present, a somewhat uncommon finding. *J. D. Fulton*

Thompson, P. R., McCarthy, D. & Reinertson, J. W. **Observations on the Virulence of *Endamoeba histolytica* during Prolonged Subcultivation.** *Amer. J. Hyg.* 1954, May, v. 59, No. 3, 249–61, 1 fig. [22 refs.]

Strain 200 of *Entamoeba histolytica*, grown either on Cleveland-Collier or Locke-egg-Locke medium with rice starch, in the presence of 2 complexes of bacteria, was used over a number of years in infecting rats' caeca and hamsters' livers, and the results are analysed in this paper. Each rat was a weanling of known stock and fed on a special ration; 100,000 trophozoites, suspended in gastric mucin and normal saline, were injected into the caecum after laparotomy, and the incidence of lesions and amoebae was assessed 7 days later. Hamsters one month old were also used and 50,000 trophozoites were injected into the liver; hepatic lesions were weighed and examined 92 hours after infection. The infection in rats showed a progressive though slight decline in magnitude throughout periods of 15 and 19 months or less, which meant that experimentally useful cultures became almost useless. Small differences in age and weight were thought to influence the nature of an infection. In hamsters no detectable loss of virulence was seen up to 7 or 8 months, but a decline was noticed after 27 months. Virulence could be easily restored by inoculation of the culture into a dog's intestine, followed by serial passage by colonic aspirates and final re-isolation some months later. *P. C. C. Garnham*

Jarpa, A. Endoscopía y amibiasis intestinal crónica. [**Endoscopy in Chronic Intestinal Amoebiasis**] *Bol. Chileno de Parasit.* 1954, Jan.–Mar., v. 9, No. 1, 14–16.

The English summary appended to the paper is as follows:—

"The results of a proctoscopic study on 41 individuals infected with *Entamoeba histolytica* are reported. In 31 of them, lesions of the mucosae were found and in 8 of 12 individuals without clinical symptomatology, ulcers of amebic type were observed. Of 6 patients with clinical symptoms (but without the parasite in the faeces) 4 showed ulcers of amebic type in the proctoscopic examination. The symptoms of these patients were relieved by the use of drugs utilized in the treatment of amebiasis."

Misra, S. **Infection of Cervix and Vagina by Protozoa** *Entamoeba histolytica*. Reprinted from *J. Obstet. & Gynaecol. India.* 1953, June, v. 3, No. 4, 3 pp., 4 figs. on 2 pls.

The author has already described two cases of amoebiasis of the vagina in 1950. Two further instances of a similar nature are now described in which there were ulcerations of the cervix and vagina caused by *Entamoeba histolytica*. In one the blood-stained vaginal discharge was noted 2 months after childbirth; in the second it was seen 4 years after abortion, and there was a history of antecedent dysentery. In the former case *E. histolytica* was present in the active form, while in the latter all stages including cysts were noted. The appearances in both were similar.

The whole vagina and vaginal portion of the cervix were covered by offensive, slimy sloughs which, when separated, disclosed superficial snail-track ulcers with undermined edges. Emetine treatment by injection, oral enterovioform combined with local vaginal douche of 2 per cent. Yatren solution proved effective.

Gynaecological textbooks as well as those on the pathology of tropical diseases do not mention infection of the vagina and cervix by *Entamoeba histolytica*, though *E. coli* and *E. vaginalis* are mentioned as having been found in these situations. Contributing factors to the infection of the vaginal tract are the high incidence of intestinal amoebiasis and the close proximity of the rectum and the presence in most women of post-partum perineal tears. It is emphasized that in order to demonstrate *E. histolytica* the ulcers must be scraped: vaginal swabs do not suffice. [See also this *Bulletin*, 1949, v. 46, 742; 1950, v. 47, 43, 240, 467; 1952, v. 49, 148, 398.]

Philip Manson-Bahr

Spicknall, C. G. & Peirce, E. C. **Amebic Granuloma.** Report of Four Cases and Review of the Literature. *New England J. of Med.* 1954, June 24, v. 250, No. 25, 1055–62, 4 figs. [125 refs.]

"Amebic granulomas may simulate other inflammatory diseases or neoplasms of the colon. Amebiasis and carcinoma of the colon may coexist.

"When a lesion of the colon is inaccessible to biopsy except by laparotomy and an amebic granuloma is suspected a therapeutic trial with antiamebic drugs is indicated before operation is performed.

"The great majority of amebomas disappear completely within a month of the beginning of treatment.

"Surgical intervention is dangerous in the presence of amebiasis or amebic granulomas and is indicated only for complications. Prompt recognition of the disease at the time of operation and proper therapy often prevent death."

Farga, V., Ossandón, M. & Chemke, J. Un caso de ameboma rectal. [**A Case of Rectal "Ameboma"**] *Bol. Chileno de Parasit.* 1954, Apr.–June, v. 9, No. 2, 61–4. [12 refs.] English summary (9 lines).

Molinier, Simonel, Jauneau & Lafaye. Quelques aspects des abcès amibiens observés en France. [**Observations on Amoebic Abscess Observed in France**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1954, Nos. 13/14, 430–35.

———, ——— & ———. Considérations pratiques concernant l'abcès amibien observé en France. *Ibid.*, 435–40. [31 refs.]

Amoebic abscesses are rarely encountered in France; their symptomatology is atypical, and, despite their gravity, patients usually tolerate their presence well. The authors base these conclusions on 14 cases they have personally studied, and on 59 cases reported in the local literature since 1946. They are of the opinion that the manifestations of amoebiasis and of its complications are still inadequately appreciated in France.

In a second paper they pursue the matter further. After considering the symptoms in the cases reviewed they conclude that pain is the most constant symptom, though even this may be absent. The most effective

treatment is the use of diffusible amoebicidal drugs such as emetine, conessine and the soluble iodides. These should be given repeatedly over a period of at least two months; mechanical evacuation of the abscess contents, by various means, should be undertaken concurrently.

A. R. D. Adams

Faiguenbaum, J., Sangüesa, M., Donckaster, R. & Miranda, M. Clortetraciclina y Oxitetraciclina en el tratamiento de la amibiasis. [**Chlortetracycline and Oxytetracycline in the Treatment of Amoebiasis**] *Bol. Chileno de Parasit.* 1954, Apr.–June, v. 9, No. 2, 50–54. [10 refs.] English summary.

Treatment of amoebiasis is an ever-present problem in medicine, because, in spite of the number of drugs which have been tried, there has always been a certain proportion of patients in whose cases they proved a failure. This article on the use of chlortetracycline (aureomycin) and oxytetracycline (terramycin), though short, is crammed with information. It records a careful study of 45 patients with amoebiasis (34 adults and 11 children under 12 years of age, 26 females, 19 males) treated with chlortetracycline, and 69 (65 adults and 4 children under 10 years, 36 females, 33 males) treated with oxytetracycline.

Dealing first with the chlortetracycline group, only 2 came for treatment on account of acute dysentery, the other 43 complained of chronic intestinal disturbances. The general scheme of treatment was to give 1 gm. daily (250 mgm. every 6 hours) for 10 days in the case of adults (4 had larger doses); children under 12 years were given 25 mgm. per kgm. body weight for 10 days, also in 4 subdoses every 6 hours. Four patients were kept in hospital, 39 were allowed to go about [nothing is said in this respect of the remaining 2]; the drug was taken in milk. The faeces were examined, 5 examinations every 3 days and 3 later up to 3 months after the treatment ended. The average number of examinations per patient was 5·2; only 4 had less than 4. Observations were kept up on an average for 2½ months, 21 for longer than this.

Thirty-six of the 45 remained free of parasites for 2½ months after the treatment ended; the other 9 still passed *E. histolytica* cysts. Six of them lived in bad hygienic surroundings and re-infection could not be excluded. On the whole the antibiotic was well tolerated; 17 complained of nausea and pruritus ani, but not enough to suspend treatment; in 4 it had to be stopped temporarily on account of vomiting. None of the children showed signs of intolerance and in 5 there was definite improvement of appetite.

Next, oxytetracycline: treatment was ambulatory, in doses of 2 gm. daily, taken in milk, in 4 divided doses, for 10 days. In this series the authors bore in mind the fact that remissions might occur spontaneously and that control examinations should be made for at least a year, and they advise 6 examinations every 4 months [but they were made every 3 months]. In the 69 receiving oxytetracycline 6 examinations were made 8 days after the treatment ceased [presumably this means that 6 slides were examined in each case] and again at 3, 6, 9 and 12 months. Of 47 [apparently 22 did not present themselves for examination] examined after 8 days, 46 were negative and 1 remained positive. Of 49 examined at the second control (after 3 months) 41 were negative and 8 positive; of 34 examined after 6 months 29 were negative, 5 still positive; at the 4th control (9 months) only 17 came; 13 were negative, 4 positive; at the 5th control, a year after treatment ceased, only 8 presented themselves, but all were negative. On the whole the drug was well tolerated; 15 complained of " weakness

and burning in the stomach ", but not severe enough to warrant suspending treatment. The authors again remind readers that re-infection could not be absolutely ruled out, and that symptoms might persist for a time in spite of faecal examinations being negative, as the " intestinal excitability and deficiency of the digestive juice might remain ". During the course of treatment the stools were usually formed; if they were loose or diarrhoeic the diet might have to be modified and return to normal diet delayed. From general observations, it was thought that oxytetracycline was the more efficacious. *H. Harold Scott*

Puyuelo, R. A propos de sept cas de psychoses post-conessiniques. Reflexions sur leur traitement et sur les dangers de la connessinotherapie aux F.T.E.O. [**Seven Cases of Psychosis after Treatment with Conessine. Dangers of this Treatment in French Troops in the Far East**] *Extrême-Orient Méd.* Hanoi. 1953, Jan.–Mar., v. 6, No. 1, 55–60.

This paper records 7 examples of the toxic effect of conessine on the central nervous system, in patients treated with it for amoebiasis. All the patients had to be invalided to Europe with psychoses, some of them grave. *A. R. D. Adams*

Debaille, G. & Petard, P. Notes préliminaires sur les plantes anti-dysentériques du Soudan et de la Haute-Volta. [**Preliminary Notes on Anti-dysenteric Plants in the French Sudan and Upper Volta Region**] *Bull. Méd. de l'Afrique-Occidentale Française.* 1953, v. 10, 11–14.

Lawless, D. K. **Report on a Human Case of** *Endamoeba polecki* **Prowazek, 1912.** *J. Parasitology.* 1954, Apr., v. 40, No. 2, 221–8, 9 figs. on pl. [15 refs.]

The author records a case of infection with an amoeba producing uninucleate cysts and attributed to " Endamoeba polecki Prowazek, 1912 ", in an Egyptian, whose stools had been examined for 33 months, in the course of which this amoeba was found in 37 out of 44 faecal samples. Although similar amoebae were obtained from pigs, none was seen in 100 persons from pig-raising communities.

A detailed illustrated description is given of the trophozoites and cysts of " *E. polecki* ", which closely resembles the entamoebae with uninucleate cysts described from monkeys, pigs, cattle, sheep and goats. The present is the 5th case reported from man. Attempts to grow this amoeba in Difco's " Bacto-Endamoeba " medium failed to establish permanent cultures, and treatment with emetine, diodoquin and vioform had no effect upon the course of infection.

As regards the name " *E. polecki* ", the author defends its validity on the grounds that amoebae with identical cystic characters are common to man and pig. [Though the author appears to accept a single species of amoebae with uninucleate cysts in the pig, there is little doubt that there are at least two species, to neither of which the name *E. polecki* can be applied (*cf.* Hoare: *Parasitology*, 1940, v. 32, 226). As regards the nature of *polecki*-like amoebae in man, their specific identity with the parasites of pigs and monkeys stands in need of verification. As shown by Lubinsky

for a Pakistani case (this *Bulletin*, 1952, v. 49, 859), the possibility that the uninucleate cysts actually represent aberrant forms of *E. histolytica* cannot be excluded.] *C. A. Hoare*

Vilela, M. P. & Helmeister, O. Giardiase intestinal. Quadro clínico e tratamento—Observações em 96 pacientes de 3 a 12 anos. Do Parque Infantil do " Ipiranga ". [**Intestinal Giardiasis. Clinical Picture and Treatment**] *Arquivos Med. Municip.* S. Paulo. 1953, Sept., v. 5, No. 3, 139–42.

Dr. Moacyr Padua Vilela has published several papers dealing with giardiasis in children. In the present, he and his colleague draw conclusions from observation of 96 patients between the ages of 3 and 12 years. From previous studies, confirmed by the present record, giardiasis is associated with a definite clinical picture characterized by diarrhoeal attacks of 3–5 evacuations during the day, the stools being yellow, loose, catarrhal, with a penetrating odour, but no blood. The evacuations are usually preceded by colic which is eased by passage of the stools. Other symptoms present are loss of appetite, anaemia, irritability, disturbed sleep, some wasting and loss of weight. Various drugs were used in treatment: metoquine (mepacrine), nivaquine, gentian violet, aralen (chloroquine), arucase (extract of Aruca) and aureomycin. In a table certain details are given: the dosage of each, the numbers treated, the numbers cured, clinically and parasitologically, the numbers showing signs of intolerance, the length of treatment and the results of examinations of faeces after treatment.

The authors sum up their results by saying that mepacrine and nivaquine gave the best results and, somewhat paradoxically, one course of the drug proved better than two; so, if the stools remain positive, the best plan is to let 30 days go by before administering a second course. The mepacrine is given in doses of " 3 pills daily for 5 days " and the nivaquine 2 pills daily. [In neither case is the strength of the pills stated.]

H. Harold Scott

Lamadrid-Montemayor, F. **Comparative Study of Chloroquine and Amodiaquin in the Treatment of Giardiasis.** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 709–11.

In Mexico the incidence of giardiasis varies from 5 to 33 per cent. Even in the absence of symptoms attributable to this parasite it is considered advisable to rid the patient of it. Since the introduction of amodiaquine in 1946 this drug has been found to be effective in a single dose. In this study, 50 patients were treated orally with amodiaquine and 50 with chloroquine. Methods of laboratory diagnosis were by direct stool examination and by flotation with zinc sulphate. As a check, stool examinations were repeated every 4 to 8 days for a period of 1 to 6 months. Chloroquine was given in doses of 0·3 gm. to adults daily for 5 days; for children from 2–12, it was given in doses of 0·2 gm. for the same period. The dosage of amodiaquine was 0·6 gm. in a single dose for adults: for children from 2–7 years, 0·2 gm. daily for two days: for children from 8–12, 0·4 gm. in a single dose. Amodiaquine in single doses proved to be the treatment of choice: all 50 patients treated with it were freed of *Giardia*, except one who was reinfected. With chloroquine 44 of the 50 patients were freed of parasites, but 4 of these required a second course. Neither drug caused detectable toxic effects. *Philip Manson-Bahr*

Raifman, J. A propósito de un caso de coccidiosis humana originada por el *Isospora hominis*. (Primera observación en la ciudad de Rosario y cuarta en el país.) [**First Human Case of *Isospora hominis* Infection Recorded in Rosario (the Fourth in Argentina)**] *Semana Méd.* 1954, July 8, v. 105, No. 2, 63–6, 74, 6 figs.

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Lowe, J. **Leprosy: Some New Concepts of Epidemiology and Control.** *Roy. San. Inst. J.* 1954, Aug., v. 74, No. 8, 723–9. [15 refs.] Discussion 729–30.

The author, asking that certain common misconceptions about leprosy should be laid aside, discusses briefly the forms of leprosy, its infectiousness and distribution, and the fact that there has been a decline of leprosy in Europe since the 16th century. He then asks: "To where, then, has this discussion brought us?" and gives the answer: "Surely to this point: that leprosy, which by its nature should propagate itself very easily, has never done so; that the human race as a whole is not highly susceptible, so that even in the most favourable conditions leprosy rarely spreads widely and rapidly. Moreover, there appears to be some factor or factors operating in the individual and in the community to reduce this low basic susceptibility to leprosy and render individuals and communities largely or completely immune". There are indications that such a factor has been more operative recently than in the Middle Ages, and more in towns than in scattered populations. The question is then discussed as to whether this factor may be due to cross-immunity between tuberculosis and leprosy. "... A previous tuberculous infection, as demonstrated by the tuberculin test, is a very frequent cause of sensitivity to the leprosy bacillus, as demonstrated by the positive lepromin test." Also in persons with a negative tuberculin and lepromin test BCG vaccination by injection or by mouth can make both tuberculin and lepromin test positive, the lepromin-positive test being generally associated with raised resistance to leprosy.

It is next shown by a number of quotations that historically there has been a diminution of leprosy in many countries corresponding with the spread of tuberculosis, the inference being that "tuberculous infection, which spreads more widely and rapidly, drives leprosy out, because it renders the population sensitive to the tubercle bacillus and therefore to the leprosy bacillus".

Lastly, the author discusses the question of the control of leprosy. He has little faith in the use of isolation, particularly compulsory isolation, to control leprosy. "It is a matter of discussion whether modern treatment is good enough to bring the disease slowly under control, but I think this not impossible". Although prolonged treatment is necessary to arrest leprosy, the patient is rendered less infectious in a comparatively short time and thus the period of isolation necessary is reduced. There is also the possibility that BCG vaccination will prove of value in immunizing contacts, particularly children. "I personally think the future of leprosy control

work is full of promise. We are not trying to combat a disease which is spreading and increasing; the downward tendency is already there; we have to try to accelerate this downward trend". The author considers notification of leprosy as being very necessary, and that all steps should be taken to prevent contact between open cases and children and young people, but that compulsory isolation is inadvisable in many countries where it will do more harm than good. He ends with a quotation from the Report of the World Health Organization Expert Committee on Leprosy [this *Bulletin*, 1954, v. 51, 271]: "Public health and not public fears and prejudices should determine the policy in respect to leprosy control".

Ernest Muir

South Pacific Commission. Noumea, New Caledonia. **Leprosy in Netherlands New Guinea.** A Survey [Sloan, N. R.]. *Technical Paper No. 56.* 1954, Apr., mimeographed pp. v. + 16, 5 maps. [2s.]

The area of Netherlands New Guinea is about 3 times the size of England with a population of about 1 million, including some 10,350 Europeans and Indo-Europeans and 9,900 Indonesians. The general conditions and the health of the people are described. Of all the diseases malaria is most serious. Among 16,882 persons seen 525 cases of leprosy were found, of which 225 were lepromatous. Some 10 different areas are described, along with the comparative prevalence of leprosy and facilities for treatment. Among the recommendations are the appointment of a whole-time leprosy officer, the founding of a central leprosarium, and the proposal that the present leprosy villages be developed and their number increased. The problems to be studied are the care of the children of patients, rehabilitation of those in whom the disease is arrested, keeping patients in the institutions, and popular education regarding leprosy. *Ernest Muir*

South Pacific Commission. Noumea, New Caledonia. **Leprosy in the Trust Territory of the Pacific Islands.** A Survey [Sloan, N. R.]. *Technical Paper No. 57.* 1954, Apr., mimeographed pp. v. + 18, 2 maps. [2s.]

This is a report of a study, lasting 3 months, of the islands of the Trust Territory lying between the Tropic of Cancer and the equator. There are 2,141 islands with a population of about 55,000 scattered over an ocean area of 3 million square miles, equal to the area of the U.S.A., but with a land area of only 687 square miles.

During the study 4,924 persons were examined and 223 cases of leprosy seen. Twenty discharged patients were not seen. There is thus a known incidence of 4·4 per thousand. It is recommended that leprosaria be established on the islands of Yap and Ponape where there is the highest incidence, which would admit only open cases and others requiring special care. There would be treatment in dispensaries for closed cases, DDS being the drug of choice. Of the 223 cases seen only 48 were lepromatous.

Ernest Muir

Griffiths, P. G. **Fiji Leprosy Hospital, Makogai (Annual Report for the Year 1951).** *Fiji, Legislative Council. Council Paper No. 39.* 1953. Appendix 3A, 13–20, 2 figs.

This Leprosy Hospital serves not only Fiji but many of the other islands of the South Pacific. The diminution of leprosy in Fiji is shown by the

rate per thousand admissions in the 1946–50 period as compared with those in the 1911–15 period; in the earlier period it was 0·32 among Fijians and 0·84 among Indians; in the later period it was 0·12 among Fijians and 0·22 among Indians. There were 101 admissions during the year reported, 31 being Indians, 22 Fijians, 21 Samoans, 16 Cook Islanders, and 4 Melanesians. Of the Samoan admissions 17 out of 21 were lepromatous, compared with 3 out of 16 from the Cook Island admissions. The more rapid decrease of incidence among Indians compared with that among Fijians may be due to the more rapid improvement in social and educational conditions among the former since 1911. The patient population of the hospital is 791, of whom 487 were arrested, quiescent or improved by the end of the year. Lepromatous cases were 62·5 per cent. Regarding treatment, the policy is to use DDS as the main drug, as it is much cheaper than sulphetrone. Also, some patients in whom sulphetrone produced toxic reactions were able to take an adequate dose of DDS. Thiacetazone was used chiefly in patients who developed either mental symptoms or exfoliative dermatitis under treatment with sulphetrone. The Report concludes: "The spirit of the patients continues high. Now that we have no terribly ulcerated patients, now that the great majority are feeling well in themselves, and able to work and play; now that they can all see that most of their fellows are obviously steadily improving; for all these reasons they have good cause to be of good heart. This change is due to the beneficial effect of the Sulphone compounds. . . ." *Ernest Muir*

Azulay, R. D. & Andrade, Lygia M. C. Demonstração do *M. leprae* em cortes em 532 casos de lepra. Estudo comparativo das técnicas de Ziehl-Klingmüller e Ziehl-Wade-Klingmüller. [**Demonstration of** *Myco. leprae* **in Sections in 532 Cases of Leprosy. A Comparative Study of the Techniques of Ziehl-Klingmüller and of Ziehl-Wade-Klingmüller**] *Rev. Brasileira Leprologia.* S. Paulo. 1953, Dec., v. 21, No. 4, 280–84. English summary.

A comparison is made between the results obtained in a search for acid-fast bacilli in sections of 523 biopsies of leprous tissues, by means of two methods, that of Ziehl-Klingmüller and that of Wade's modification of the Ziehl-Klingmüller method [see this *Bulletin*, 1952, v. 49, 626]. With Wade's modification 88 were positive, although negative with the original method; and the authors consider that with the Wade method alcohol- and acid-resistance is not only preserved but is restored where it has been lost. *Ernest Muir*

Schujman, S. El valor del estudio inmunológico en la lepra. [**The Value of Immunological Studies in Leprosy**] *Semana Méd.* 1954, July 22, v. 105, No. 4, 146–54, 5 figs. [11 refs.] English summary.

The author first reviews the technique and significance of the lepromin test. He holds that the early reaction (Fernandez) occurring in 24 to 48 hours is allergic in nature, but that it can only occur in persons who have the retarded (Mitsuda) reaction (occurring in 4 to 6 weeks) previously positive. Those with the latter reaction positive may however attain a positive Fernandez reaction as the result of repeated injections of lepromin antigen. Persons living in countries where there is no leprosy frequently have a positive Mitsuda reaction, and the author considers that this is the natural condition and is not due to previous contact with *Myco. leprae* or

with any other form of mycobacterium. [No ground for excluding contact with other mycobacteria is given.] *Ernest Muir*

DE MESQUITA, S. J. B. Die Lepromin-Reaktion bei 80 Marine-Infanteristen aus Holland. [**The Lepromin Reaction in 80 Marines from Holland**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1954, July, v. 5, No. 3, 376–8.

Of 80 marines staying temporarily in Surinam 7 had previously been in Indonesia, but the rest had come direct from Holland. The lepromin test showed a positive early reading (Fernandez) in 10, and a late reading (Mitsuda) in 31. The author considers that this proportion of positive results is below the average obtained in healthy persons elsewhere.
Ernest Muir

GEHR, E. & MUNDER, H. M. Die Lepromin-Reaktion bei verschiedenen Volksgruppen in Suriname. [**The Lepromin Reaction in Various Groups of People in Surinam**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1954, July, v. 5, No. 3, 379–87, 7 figs.

Five groups of people were selected and their reactions to the lepromin (early and late readings) are recorded in 6 tables, results in children and in adults being given separately. All were clinically healthy. The lowest number of positive reactions was in the group consisting of S. American Indians among whom there were no contacts with leprosy. The other groups were family contacts, persons associated with leprosy institutions, patients from a psychiatric clinic and primitive indigenous persons. The results are tabulated in very great detail.

Trials showed that dilution of lepromin to 1 in 100 could still produce a strongly positive reaction, as is illustrated by photographs taken at weekly intervals. *Ernest Muir*

LOWE, J. **The Late Results of Sulphone Treatment of Leprosy in East Nigeria.** *Leprosy Review.* 1954, July, v. 25, No. 3, 113–24.

An account is given of 117 out of 131 patients available for analysis whose treatment with sulphones began between March 1946 and March 1948. Out of these 88 had been discharged with disease inactive and smears negative. 17 in a similar condition were awaiting discharge, and in 12 the disease was inactive but smears were still positive. Out of 229 discharged 208 (92 per cent.) returned for examination on 1 to 9 occasions up to a period of 5 years.

Out of 148 discharged lepromatous cases 139 were re-examined, and of these 139, 15 (10·8 per cent.) showed slight signs of reactivation. Of the 81 tuberculoid cases discharged 8 showed signs of reactivation, but none became lepromatous. In both types reactivation was generally within 1 year, occasionally 2 years, and all cleared up again with or without further treatment.

These results are compared with those reported by ERICKSON [this *Bulletin*, 1951, v. 48, 166] in 1950 in which 33 out of 77 lepromatous cases discharged as arrested had been re-examined and 6 had shown signs of relapse. Erickson, however, himself says that too much stress should not

be placed on these figures, as the proportion who returned for examination was small, and those " who develop visible evidences of the disease are, undoubtedly, more likely to return for examination than those who do not develop them."

Lowe concludes: " The findings of this study of the late results of sulphone treatment of leprosy reveal the main weakness of the treatment, namely the extreme slowness of its action; but also reveal its strong points, the sureness of its action and the permanence of results in most cases. These findings strengthen the view that is steadily gaining ground, that sulphone treatment constitutes a major revolution in the treatment of leprosy." *Ernest Muir*

Laviron, P. & Lauret, L. Résultats d'ensemble, après cinq ans, du traitement de la lèpre par le 3668 R.P. (Cimédone). [**The Average Results after 5 Years of Treatment with 3668 RP (Cimédone)**] *Méd. Trop.* Marseilles. 1954, Jan.–Feb., v. 14, No. 1, 65–8.

This is a report on results after treatment of 71 lepromatous, 7 tuberculoid and 7 undifferentiated cases of leprosy for periods up to 5 years, with Cimédone, the French equivalent of sulphetrone. The degree of improvement is graded into 1, 2 and 3 plus. Of the lepromatous patients there was 3-plus clinical improvement of 44, 42, 80 and 90 per cent., respectively, in those with treatment up to 2, 3, 4 and 5 years, and 39 became bacteriologically negative. There was some amelioration in 98 per cent. of those treated.

Cimédone was given at first intravenously, but this was soon abandoned because of the many reactions and the difficulty of giving daily injections. Oral treatment was substituted, patients being given 2 tablets of 0·5 gm. daily for the 1st week, 4 for the 2nd, and then 6 tablets [3 gm.] continuously with a break of 1 week after every 4 weeks. There was intolerance only in 2 cases; reactions which were numerous at first became less as treatment proceeded. In none of the lepromatous cases did the negative lepromin reaction become positive.

The results in tuberculoid and undifferentiated cases were not as good as in the lepromatous. Compared with treatment with DDS, that with Cimédone gave, if not more rapid, at least more appreciable results. The inconvenience of Cimédone is that it is necessary to give large quantities daily, which makes it unsuitable for mass treatment. *Ernest Muir*

Laviron, P., Lauret, L. & Jardin, G. Résultats après trois ans du traitement de la lèpre par des injections espacées de D.D.S. dans le chaulmoograte d'éthyle. [**Results after 3 Years of Leprosy Treatment with Spaced Injections of DDS in Chaulmoogra Esters**] *Méd. Trop.* Marseilles. 1954, Jan.–Feb., v. 14, No. 1, 69–71.

Ninety-one patients were treated at the Marchoux Institute in the French Sudan and 1,134 at bush centres. Injections were given intramuscularly of 5 cc. of chaulmoogra ethyl esters suspending 1·25 gm. of DDS twice a month. This was found sufficient to maintain an adequate level of sulphone concentration in the blood for 15 days. Tolerance was good, treatment having to be interrupted only in 6 cases. There were 4 deaths from intercurrent diseases during the course of treatment. Lepra reactions were frequent during the first few months, but became exceptional after the

second year of treatment. Improvement was most marked in the lepromatous cases and less in the other forms. In the first year, of 56 lepromatous patients 3 became bacteriologically negative, 7 in the second year and 17 in the third. The first few injections sometimes gave local pain with accompanying fever for 2 or 3 days, but after a few injections this pain did not occur.

This form of treatment is liked by the patients, and is convenient for the 22 doctors who carry out the treatment over wide areas. *Ernest Muir*

Gussenhoven, G. A. Behandeling van lepra met isonicotinezuurhydrazide. [**Treatment of Leprosy Patients with Isonicotinic Acid Hydrazide (INH)**] *Nederl. Tijdschr. v. Geneesk.* 1954, Sept. 4, v. 98 (iii), No. 36, 2481–7.

The English summary appended to the paper is as follows:—

"Eleven leprosy patients in South Sumatra (Indonesia) were treated with INH. In one patient a serious leprosy reaction was interrupted; a second showed repeatedly serious reactions by the drug. Of the other nine none showed any improvement, neither clinically, bacterioscopically or histopathologically. A daily dose of 6 to 8 mg per kg body weight caused in the majority of patients serious toxic reactions."

Farina, R. Cirurgia plástica e reparadora da cabeça na lepra. [**Plastic Surgery of the Head in Leprosy**] *Rev. Brasileira Leprologia.* S. Paulo. 1953, Dec., v. 21, No. 4, 261–79, 24 figs. [14 refs.]

de Broekert, W. & Hermans, E. H. De therapie van lepra. [**Treatment of Leprosy**] *Nederl. Tijdschr. v. Geneesk.* 1954, Sept. 4, v. 98 (iii), No. 36, 2507–13. [11 refs.]

A general account with discussion of the literature.

Jardin, C. La fabrication des médicaments antilépreux à l'Institut Marchoux de Bamako. [**Manufacture of Anti-Leprosy Preparations at the French Sudan Marchoux Institute at Bamako**] *Bull. Méd. de l'Afrique-Occidentale Française.* 1953, v. 10, 309–14.

Souza Campos, N. O B.C.G. na profilaxia da lepra. (Revisão bibliográfica.) [**Bibliographical Review of Leprosy Prophylaxis**] *Rev. Brasileira Leprologia.* S. Paulo. 1953, Dec., v. 21, No. 4, 292–314, 1 chart. [81 refs.]

Hadler, W. A. Estudo comparado das lesões provocadas pela injeção intradérmica de suspensões de *M. leprae* e *M. tuberculosis* em cobaios normais. [**A Comparative Study of the Lesions produced by Injection of Suspensions of** *Myco. leprae* **and** *Myco. tuberculosis* **in Normal Guineapigs**] *Rev. Brasileira Leprologia.* S. Paulo. 1953, Dec., v. 21, No. 4, 315–40, 13 figs. & 1 graph. [24 refs.] English summary.

The guineapigs were divided into 4 groups: 32 were injected intradermally with a suspension containing 0·33 mgm. of BCG, 20 with lepromin

containing 0·074 mgm. of *Myco. leprae*, 20 with lepromin containing nearly 0·34 mgm. of *Myco. leprae*, and 20 with BCG on the one side and lepromin on the other in doses similar to groups 1 and 3.

BCG produced a stronger initial reaction which lasted for 21 days. Lepromin produced a weaker reaction but it lasted longer—for 30 or 40 days. The type of reaction was similar in both and was divided into 2 phases: (1) the macrophage phase, coming on after an acute reaction, in which the bacilli are phagocytosed by the macrophages and lysis takes place, also the macrophages are converted into epithelioid cells; (2) the epithelioid-cell phase, in which the epithelioid cells split up further and eliminate the lysis products. The former phase is shorter in the guineapigs inoculated with BCG and the epithelioid cells appear earlier than in those inoculated with lepromin. The two types of histological picture in leprosy are explained by these findings: the lepromatous in which the macrophages are unable to destroy the bacilli, and the tuberculoid in which the bacilli are destroyed and epithelioid cells formed. Also in non-leprous persons inoculated with lepromin there are 2 types: those in whom the macrophages can, and those in whom they cannot, destroy the bacilli. *Ernest Muir*

Hadler, W. A. & Zitti, L. M. Estudo da sensibilidade tuberculínica em cobaios normais inoculados experimentalmente com *M. leprae*, *M. lepraemurium* e *M. tuberculosis*. [**A Study of the Sensitivity of Normal Guineapigs to Tuberculin after Experimental Inoculation with** *Myco. leprae*, *Myco. leprae murium* **and** *Myco. tuberculosis*] *Rev. Brasileira Leprologia*. S. Paulo. 1953, Dec., v. 21, No. 4, 341–64, 2 graphs. [63 refs.] English summary.

The experiment comprised 4 groups of guineapigs: 59 inoculated intraperitoneally or intracutaneously with suspensions of lepra bacilli of 4 different strengths; 38 inoculated intraperitoneally with suspensions of rat leprosy bacilli of 2 different strengths; 51 inoculated intraperitoneally with BCG suspensions of 2 different strengths; 25 uninoculated guineapigs used as controls.

After these inoculations the tuberculin reaction was tested at repeated intervals with 0·05 ml. of 1 in 10 OT. In the guineapigs inoculated intraperitoneally with *Myco. leprae* tuberculin hypersensitivity developed, reaching its maximum in 30 days, and was well established in 20 to 25 per cent. of animals, but it disappeared by the 60th day. In the intracutaneously inoculated sensitization was less marked and occurred only in those which had been given larger doses. In the animals inoculated with *Myco. leprae murium* the degree of sensitization was much stronger and corresponded with that produced by BCG. It increased slowly up to the 60th day and began to diminish on the 200th day after inoculation. The authors consider that the degree of sensitization to *Myco. leprae* and *Myco. leprae murium* in guineapigs depends on the ability of macrophages to destroy the mycobacteria, and the similarity of chemical composition of some antigenic fractions of the 2 organisms. *Ernest Muir*

Azulay, R. D. O papel protetor do B.C.G. na lepra murina. [**The Protective Property of BCG in Rat Leprosy**] *Rev. Brasileira Leprologia*. S. Paulo. 1953, Dec., v. 21, No. 4, 285–91. [19 refs.] English summary.

Fifty-seven rats were inoculated each with 20 mgm. of BCG, 20 other rats being left as uninoculated controls. Both groups were inoculated

with *Myco. leprae murium* 115 days later. In the group inoculated with BCG the lesions appeared later and were smaller in size. There was no difference in the morphology or staining of the bacilli in the two groups, but the percentage of infection in the internal organs was greater in the unprotected group, and the lesions were more extensive. Because of the similarity between rat and human leprosy it is considered that these experiments confirm the viewpoint that BCG is useful in the prophylaxis of human leprosy. *Ernest Muir*

Cruickshank, J. C. **Isoniazid in the Treatment of Rat Leprosy.** *Lancet.* 1954, Sept. 11, 528–9. [13 refs.]

This communication is in continuation of a previous one [this *Bulletin*, 1953, v. 50, 524] which reported retrogression of rat leprosy in experimentally infected rats under treatment with isoniazid. More prolonged observations have however shown that with the dosage given permanent cure was not obtained. The survival time of the treated rats averaged 70·7 weeks as compared with 34·6 weeks in untreated controls; but all the animals died in the end of rat leprosy. These observations are taken to support the opinion in published clinical work that isoniazid should not be used alone in the treatment of human leprosy. *Ernest Muir*

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—Trematodes (*schistosomes, other flukes*); Cestodes (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); Nematodes (*Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

Wellensiek, U. Vergleichende Untersuchungen mit der Helmintheneier-Zählkammer von Zschucke und der sogenannten McMaster-Zählkammer unter besonderer Berücksichtigung ihrer Anwendung im chemotherapeutischen Versuch. [**Comparative Studies of the von Zschucke and McMaster Techniques for Counting Helminth Eggs, with special reference to their Use in Chemotherapeutic Tests**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1954, July, v. 5, No. 3, 296–301.

The English summary appended to the paper is as follows:—

" When testing the chemotherapeutic effect of drugs in helminth diseases of animals, egg counts in the feces should be not only reliable but also speedy and practical in method. Comparative studies demonstrated that the Telemann concentration method and the use of the Zschucke counting chamber are the procedure of choice, except for some circumstances when the McMaster method and counting chamber is given preference.

" For details, the paper itself and tables given should be consulted."

Schwetz, J. **Reflections on the " Problem " of Classification and Nomenclature of Molluscs, Transmitters of Schistosomes in Africa.** *J. Trop. Med. & Hyg.* 1954, June, v. 57, No. 6, 125–31, 7 figs.

The author believes that workers on the above molluscs have created the problems of classification and nomenclature as a result of their unreasonable nominalism in routine. He contrasts the situation with that in medical entomology, and emphasizes the adult variability which occurs in animals like molluscs having no distinct metamorphosis in their life history [*i.e.*, in which growth is more or less *continuous* even in maturity]. Schwetz enumerates examples of disagreements between " expert malacologists " asked to identify African planorbids. He is very critical of such " experts " as in other papers he has published [Schwetz, this *Bulletin*, 1948, v. 45, 348; 1954, v. 51, 701]. He proposes the following general classification of the African planorbids: (i) big, flat shells, 15 mm. in diameter; (ii) shells carinated on one or on both sides; (iii) globulous shells of various sizes, *i.e.* neither flat nor carinated; (iv) shells of special shape. Schwetz then summarizes his " ecological " classification which is basically into: (a) *Planorbis* from the Great Lakes, and (b) fluviatile *Planorbis*. Six of his types of *Planorbis*, and two species of *Physopsis* are illustrated [by indifferent reproductions of photographs]. He briefly comments on the initial results he has obtained from several years' breeding experiments with African planorbids. Schwetz then proposes a series of names for his types of planorbids, and in his proposals firmly rejects any necessity for adherence to the law of priority in nomenclature. He concludes by stating that those concerned in this field of tropical medicine should dispense with malacologists and work themselves both on schistosomiasis and conchology. In an addendum Schwetz claims that, as regards Bulinidae in Central Africa, all types (or species) of *Physopsis* are concerned in the transmission of schistosomes.

[It seems unlikely that any taxonomic problem could be clarified by a rejection of the fundamental rules of nomenclature, in the way the author suggests. This is doubly unfortunate, since it is probable that the best solution of the difficulties could come from Schwetz's own breeding experiments and widespread collecting. Other recent work, *e.g.* Ranson (this *Bulletin*, 1954, v. 51, 948), promises a better systematic knowledge of the African Planorbidae without need for any rejection of the normal principles of taxonomy. A malacologist of wide experience in this field has recently summarized the difficulties and proposed some solutions (Hubendick, *Proc. Malac. Soc. Lond.*, 1954, v. 31, 6). In justice to Schwetz it is noteworthy that in his opinion the systematics of the African Planorbidae are only interesting from the zoological point of view, and are comparatively unimportant to medicine, since he (Schwetz) affirms that *all* African *Planorbis* are apt to transmit Bilharzia (*S. mansoni*).]

W. Russell Hunter

Bayer, F. A. H. **Schistosome Infection of Snails in a Dam traced to Pollution with Sewage.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1954, July, v. 48, No. 4, 347–50.

Infection with rectal schistosomiasis was detected in 4 inhabitants of Durban and enquiry as to possible sources suggested a dam. On investigation large numbers of snails were found in it, some of which were shedding fork-tailed cercariae resembling those of human schistosomes. *Schistosoma mansoni* ova were recovered from laboratory animals infected with them.

There was little excretal pollution of the fields forming the watershed of the dam and infection of the snails was believed to have resulted from a 10-minute discharge into the dam of fresh sewage from a sewer main serving a modern housing site for Africans, which had been opened to clear a blockage.

The snail population consisted of *Biomphalaria pfeifferi* and *Physopsis* sp. (*globosa* or *africana*) in considerable numbers, a smaller number of *Lymnaea natalensis* and *Melanoides tuberculata*, and a few *Bulinus tropicus*. Of 240 *B. pfeifferi* collected from within 20 feet of the site of the sewage inflow 21·3 per cent. discharged schistosome cercariae, while only 1·27 per cent. of 79 collected from further away were infected.

Only one of the 155 *Physopsis* collected was infected and it was found within 20 feet of the site of pollution. No other species of snail discharged human schistosome cercariae. Subsequent and more extensive snail collections confirmed that infection was virtually limited to the dam, for only one *B. pfeifferi* and one *Physopsis* were found infected in the streams feeding the dam. *S. haematobium* is known to occur in the population served by the sewer and the low incidence of *Physopsis* infection is, therefore, surprising. It is suggested that the ova may hatch when flushed out of the water closets and the miracidia fail to survive in the sewer. In the case of *S. mansoni*, however, some ova will not come in contact with water until the faeces are macerated. This infection was not common in the population served by the sewer and the high incidence of snail infection following such a short period of pollution indicates the risk of spread in rural areas where faecal pollution of streams is increasing. Moreover, the perennial flow of South African rivers is deteriorating and the increase of pool formation in the dry season favours the vectors of human schistosomiasis. *T. H. Davey*

Usborne, V. **The Symptoms of Urinary Bilharziasis in the Kwimba District of Tanganyika.** *South African Med. J.* 1954, July 31, v. 28, No. 31, 641–2.

The author, while a Research Officer in East Africa, investigated the symptoms of urinary schistosomiasis in the Kwimba district of Sukumaland in Tanganyika, about 50 miles south of Lake Victoria, where dams were frequently the source of infection. He studied two groups of people suffering from the urinary form of the disease—one group consisting of those receiving dispensary treatment and the other group which were not being treated. The first group was composed of 100 persons of all ages attending the dispensary; 47 of them were under 15. In the second group were 42 people, aged 15 or more, who were visited in their own homes.

Clinical examination failed to reveal a higher incidence of splenic or hepatic enlargement than that found in the general population. Fifteen per cent. of the patients aged 15 or over, attending the dispensary, missed one or more days' work as did 11½ per cent. of those not attending for treatment.

The usual reason for seeking treatment was painful micturition.

Of the total 100 patients attending the dispensary, haematuria was found in 95, dysuria in 84, weakness in 57, abdominal pain in 47, frequency of micturition in 50, effect on working capacity in 40. In the 42 persons who did not seek treatment, haematuria was found in 28, dysuria in 25, weakness in 17, abdominal pain in 14, frequency of micturition in none, effect on working capacity in 11, and limb pains in 8.

The author concludes that (1) a fair proportion of infected people with

one symptom also suffer from others; (2) work may be interfered with probably by the effects of the disease; (3) many have symptoms which do not greatly trouble them, for they do not bother to seek treatment; (4) treatment is somewhat troublesome, sometimes on account of distance to be traversed, or dislike of repeated visits for injection. *Michael Gelfand*

KHALIL, H. A. **A Case Record of Bilharziasis of the Lip.** *J. Egyptian Med. Ass.* 1954, v. 37, No. 6, 720–23, 1 fig. on pl. [17 refs.]

The author, from Cairo, describes the case of an ulcer of the lip in a man of 50. It was diagnosed clinically as a malignant or syphilitic ulcer, but serological and histological examination did not support this.

Fresh and calcified schistosome ova, in a granulomatous matrix with many eosinophiles, were found under the epidermis of the lip. The species of *Schistosoma* is not stated, nor is it evident from the accompanying photomicrograph.

The author briefly reviews the literature of ectopic schistosomiasis, and concludes on histopathological grounds that the present case is one of schistosome infection of the lip. *H. J. O'D. Burke-Gaffney*

LUMB, G. **Peritoneal Pseudo-Tubercles in Schistosomiasis.** *J. Path. & Bact.* 1954, Apr., v. 67, No. 2, 612–14, 4 figs. on pl.

A woman of 41 years, returned to Britain after long residence in the Nile Valley region, was admitted to the Westminster Hospital in London with an acute abdominal emergency. On laparotomy numerous tubercles were seen over the peritoneum. On biopsy of these *Schistosoma mansoni* eggs were found; but subsequent search of stool and urine specimens at this hospital failed to yield eggs. There is a description of the histopathology of the pseudo-tubercles, which is illustrated by photomicrographs.

A. R. D. Adams

MONTENY, V. A. R. Les infestations par *Schistosoma mansoni* et leur traitement par les sels antimoniés. [*Schistosoma mansoni* **Infections and their Treatment with Antimony Salts**] *Ann. Soc. Belge de Méd. Trop.* 1954, Apr. 30, v. 34, No. 2, 203–7.

Over a period of 5 years more than 10,000 stool examinations have been done on some 3,000 persons at the Gold Mines at Kilo-Moto, Belgian Congo; these disclosed that 328, or about 11 per cent. of them, were passing *Schistosoma mansoni* eggs; there were also other intestinal helminthic infestations. Only 191 of the patients infected with schistosomes suffered clinical symptoms ascribable to the infection; and only these patients were treated specifically. Antimonials—in the form of potassium antimony tartrate, anthiomaline, Fouadin, Reprodal, or Tristibine—were employed in the treatment, and the clinical effects were excellent as judged by observation for 6 months to 5 years. Thirty of the patients with schistosomiasis had X-ray examinations of the chest; no X-ray evidence of pulmonary schistosomiasis was found. In only 6 of the 143 examined while on antimony treatment were some temporary electrocardiographic changes observed.

The author concludes that the actual preparation of antimony used in treatment is immaterial; it is the amount of metallic antimony given either intravenously or intramuscularly that matters. It is unnecessary to treat every person passing *S. mansoni* ova in the stool. Treatment will cause

the disappearance of symptoms although it may not sterilize the infection. Pulmonary schistosomiasis is not prevalent in this area; heart changes, as shown by electrocardiographic changes, if they do appear during antimony treatment, disappear after its completion. Intestinal schistosomiasis in fact is not the scourge that many authors have described it to be; the infection rate is falling. Treatment will not cause the disappearance of the infection from an area, but preventive measures such as proper water protection will in due course do so. *A. R. D. Adams*

Schwetz, J. Réflexions sur la prophylaxie anti-bilharzienne en Afrique centrale et tout spécialement au Congo belge, avec quelques considérations sur l'étiologie et l'endémiologie. [**Observations on the Prevention of Schistosomiasis in Central Africa, especially the Belgian Congo, and on Aetiology and Epidemiology**] *Ann. Soc. Belge de Méd. Trop.* 1954, Apr. 30, v. 34, No. 2, 233–50. [10 refs.]

This is a discursive paper dealing briefly with several aspects of schistosomiasis. Differences in reports regarding the pathogenicity of the disease are attributed to variations in epidemiological factors from place to place and from time to time. Similarly, local conditions must determine the method of control used. Health education is dismissed because it takes too long. Molluscicides, at present fashionable, are valuable but are not the only method of attack. Snail vectors require shade, and in ponds with dry, shady banks, simple clearing of vegetation will suppress planorbids. In marshy streams this must be combined with molluscicides. The marshy shores of lakes and long marshy rivers are too extensive for molluscicidal treatment and the author maintains that at present and in the near future treatment of the definitive host will continue to be the main control measure. The toxicity of the antimony compounds, which are the most effective drugs, deter patients. Miracil, in the author's limited experience, has a low toxicity and gives good results in both vesical and intestinal infections. The dosage employed was about 100 mgm. per kgm., divided and given twice daily for 5 days. Oral treatment is acceptable even to symptomless carriers and it can be administered by medical auxiliaries. It is recommended that mass treatment with this drug should be given widely in schistosomiasis foci.
T. H. Davey

Cairo: Ministry of Public Health. Medical Affairs. **9th and 10th Annual Reports Bilharzia Snail Control Section 1950 and 1951.** pp. vi + 75, 5 maps on 5 pls. 1954. Cairo: Govt. Press.

In previous reports in this series the period dealt with was from one spring survey to the next, because it was at this season that results were assessed. For the sake of uniformity with other Government Departments future reports will deal with the work during a calendar year and this issue, therefore, comprises two reports covering a period of 20 months ending in December 1951.

Snail control has been extended in the Delta provinces and certain other areas, but the full expansion proposed was curtailed by limitations on the training of additional staff. The virtual elimination of *Bulinus* from the western oases, recorded in the 8th Report [this *Bulletin*, 1954, v. 51, 603], has been confirmed so far as water reservoirs and main irrigation channels are concerned, but small infestations have been found in rice fields, possibly introduced with transplanted rice seedlings. In the oases *Lymnaea cailliaudi* continued to be difficult to control.

The results, when compared with those of previous years, show that in most cases snail infestation is a little less. No figures are given of the cost of control but some 4,000 tons of copper sulphate were used. None of the new molluscicides appears to have been employed. In the laboratory report an investigation is described concerning the effect of silt and mud on the concentration of copper sulphate solutions. In distilled water the concentration remained unaltered over 3 days, but in Nile water it dropped to 2/3 in 1 hour, to 1/2 in 1 day and to 1/7 in 3 days. In Nile water with a freshly prepared mud bottom the decrease was accelerated, the figure being 1/2 in 1 hour, 1/6 in 1 day and 1/70 in 3 days. Tartaric acid, when added in concentrations of 1 to 5 parts per million, appeared to stabilize the copper sulphate concentration for about 5 hours only. Citric acid was more effective and when present in a strength of 5 parts per million the copper sulphate concentration only fell to about 1/2 in 2 days and very little more in 3 days. *T. H. Davey*

Halawani, A. **Control of Schistosomiasis by Molluscacides. Report on the Molluscacides Sodium Pentachlorophenate and Dinitro-*o*-Cyclohexylphenol (D.C.H.P.).** *J. Egyptian Med. Ass.* 1954, v. 37, No. 6, 581–612. [15 refs.]

This paper records the results of experiments designed to study the molluscicidal activity of sodium pentachlorophenate and dinitro-*o*-cyclohexylphenol (DCHP) under field conditions. In stagnant canals and drains only a proportion of the snails were killed in 24 hours by sodium pentachlorophenate and DCHP at 5 and 10 parts per million, but after 3 days all were dead and no live snails were subsequently recovered over a period of 2 months. In a control stretch in which copper sulphate at 10 parts per million was used, live snails were found at all times during the observation period. The dams across the drains could only be kept closed for about a week and when they were removed from those areas treated with pentachlorophenate and DCHP all snails were killed for a further distance of 60 metres by the 20th day and for 150 metres by the 30th day. In the case of open sulphation, *i.e.*, sulphation of flowing canals which are not closed during the treatment, results are reported to be satisfactory provided there is dense vegetation along the sides. The copper sulphate is applied in this vegetation where the current is negligible. When sodium pentachlorophenate and DCHP were applied to flowing canals they both failed in concentrations up to 10 parts per million. One experiment showed that snails were killed within one hour at the site of application but as a rule the current carried the molluscicide away and stopped its action. Copper sulphate in the same concentration was inferior to the new snail poisons under these conditions. The concentration of these molluscicides was determined colorimetrically and in open canals was found to drop to 3 parts per million after 24 hours and to 1 part per million after 6 days. The samples for analysis were taken in very thick vegetation where there was no current.

Small fishes and leeches were killed by the concentration of the new molluscicides used. Copper sulphate did not interfere with the germination or root-growth of plants. DCHP appeared to stimulate germination, but sodium pentachlorophenate inhibited root-growth. Some toxicity experiments with animals were carried out, the results indicating that in the strengths employed the molluscicides were non-toxic. No signs of toxicity were noted in any of the stock drinking from the treated canals.

T. H. Davey

Corrêa, M. O. A. Incidência da esquistossomose *mansoni* em imigrantes oriundos de outros Estados. [**Incidence of** *S. mansoni* **Infections in Immigrants arriving in São Paulo from Other States**] *Rev. Inst. Adolfo Lutz.* S. Paulo. 1953, v. 13, 91–8. [14 refs.]

The English summary appended to the paper is as follows:—

"Emphasis is put on the role of immigration from other states in spreading schistosomiasis in the state of São Paulo. Data on helminthologic infestation in 1,010 immigrants—579 males and 431 females—are furnished as well as a statistical analysis.

"Cases in number of 248 (24·5%) had ova of *Schistosoma mansoni* in the faeces; 130 (22·4%) were males and 118 (27·3%) females. Statistical data evidenced a higher incidence in men below 10 and above 30. Between 10 and 30 years of age, the higher incidence was in the female group. In table 6 are the counties from the state of São Paulo where higher number of immigrants were located. Need of special care in a prophylactic campaign is emphasized."

Ferreira, J. M. & Corrêa, M. O. A., with the collaboration of Emilia C. de Castro. Helmintíases entre escolares da Cidade de São Paulo, com especial referência à esquistosomíase mansônica. [**Helminthic Infections in Children in São Paulo, with special reference to** *S. mansoni*] *Arquivos Facul. de Hig. e Saúde Pública Univ. de São Paulo.* 1953, Dec., v. 7, No. 2, 257–69.

The English summary appended to the paper is as follows:—

"Considering that some areas of the city of São Paulo, adjoining the rivers Tietê and Pinheiros afford, at least potentially, basic conditions for the appearance of foci of Manson's schistosomiasis, the authors made a helminthological survey among 5,536 school children, aged from 7 to 14, living in those regions of the city. They found 32 school children harbouring *S. mansoni*, all of them showing a high degree of infestation and all of them natural from other states of Brazil. They found also infestation by other worms, chiefly *A. lumbricoides* (61·7%), *T. trichiura* (51·3%) and Ancylostomidae (20·3%). Among the 32 harbouring *S. mansoni*, a group of 20 was examined clinically, 11 cases of hepatomegaly being found, 3 showing spleno-hepatomegaly. After specific treatment for schistosomiasis made with Miracil 'D' in 11 cases and with Repodral in 9 cases, 95% of the school children showed negative results repeatedly during several months in stool examinations made by Hoffman, Pons and Janer's technique."

Newton, W. L. **Tissue Response to** *Schistosoma mansoni* **in Second Generation Snails from a Cross between Two Strains of** *Australorbis glabratus*. *J. Parasitology.* 1954, June, v. 40, No. 3, 352–5.

The author showed in a previous paper [this *Bulletin*, 1953, v. 50, 224] that whereas a Puerto Rican strain of *Australorbis glabratus* was susceptible to infection with a local strain of *Schistosoma mansoni*, a morphologically identical strain of *A. glabratus* from São Salvador, Brazil, was resistant; while in a later paper [this *Bulletin*, 1954, v. 51, 69] he confirmed by a histological examination of the snails, that this resistance was associated with a fibrotic type of walling-off reaction occurring in the tissues of the immune strain. In the experiments described in the present paper 29 snails of a F_2 population which were derived originally from a cross between the

susceptible Puerto Rican strain and the non-susceptible Brazilian strain, were each exposed to 20 miracidia of *S. mansoni* from Puerto Rico. The snails were fixed 54 hours after exposure and then sectioned. "Previous studies had shown that the parasite was destroyed in the parent Brazilian snails within 24 to 48 hours after penetration, and that there was a marked cellular reaction against the parasite. In the parent Puerto Rican snails, the latter developed normally, and no cellular response occurred. In the F_2 snails of the present study, tissue behaviour characteristic of each of the parent populations occurred, along with reactions which gave the appearance of being intermediate between the two. In five of the snails, both normally developing parasites and those which elicited a cellular response, and were destroyed, were found in the same snail.

"These findings suggested variation in both the susceptibility of the snail and the ability of the parasite to survive and develop. The problem of demonstrating the existence of variation in the parasite against a variable background of snail susceptibility is discussed." *R. M. Gordon*

Magalhães Neto, B. Sôbre a presença de uma invertase no estômago do *Australorbis glabratus*. [**Presence of an Invertase in the Stomach of** *Australorbis glabratus*] *Publicações Avuls. Inst. Aggeu Magalhães.* Recife, Brazil. 1953, v. 2, 1–3. English summary (4 lines).

Magalhães Neto, B. & de Almeida, A. M. Sôbre a presença de uma amilase gástrica em *Australorbis glabratus*. [**Presence of a Gastric Amylase in** *Australorbis glabratus*] *Publicações Avuls. Inst. Aggeu Magalhães.* Recife, Brazil. 1953, v. 2, 115–19, 2 charts. English summary (3 lines).

Barbosa, F. S. & Coêlho, M. V. Ação da dessecação sôbre as fases larvárias intracaramujo de *Schistosoma mansoni* em *Australorbis glabratus*. [**Action of Drying on the Developing Stages of** *S. mansoni* **in** *Australorbis glabratus*] *Publicações Avuls. Inst. Aggeu Magalhães.* Recife, Brazil. 1953, v. 2, 159–62.

The English summary appended to the paper is as follows:—

"In laboratory conditions it was observed that *Australorbis glabratus* infected with *Schistosoma mansoni* can survive desiccation but lose their infection. Sporocysts and cercariae degenerate on the 20th day of desiccation.

"Infected snails die off more quickly than uninfected."

Magalhães Neto, B. Ação da dessecação e do jejum sôbre a respiração do *Australorbis glabratus*. [**Action of Drying and Fasting on the Respiration of** *Australorbis glabratus*] *Publicações Avuls. Inst. Aggeu Magalhães.* Recife, Brazil. 1953, v. 2, 5–9, 1 chart.

The English summary appended to the paper is as follows:—

"Studies were made on the effect of desiccation on the oxygen consumption in *Australorbis glabratus*. A decrease in the oxygen consumption of desiccated animals was shown."

Barbosa, F. S. A propósito da remessa de planorbídeos dessecados, especialmente *A. glabratus*. [**The Dispatch of Snails in the Dried State, especially** *A. glabratus*] *Publicações Avuls. Inst. Aggeu Magalhães.* Recife, Brazil. 1953, v. 2, 99–102.

The English summary appended to the paper is as follows:—

"The author reviews the different methods usually used for packing and shipping the snail vectors of Schistosomiasis mansoni. Due to the ability of *A. glabratus* and *T. centimetralis* to survive desiccation for a long time it was assumed that better results could be obtained with desiccated snails.

"Technic for desiccating the snails prior to packing is presented. The dried snails were packed on unmoist filter paper. High humidity and organic matter inside the shipping boxes should be avoided.

"The table shows the survival of snails. The critical point seems to be around 30 days for the results under that period were usually 100%.

"Special care should be taken for the permittance of infected snails for it was observed that after 18 days desiccation is harmful to the larval stages of *S. mansoni*."

Ruiz, J. M. & Carvalho, J. M. A. *Australorbis immunis* (Lutz, 1918) hospedeiro intermediário de *Schistosoma mansoni* na cidade de Santos, Estado de São Paulo. [*Australorbis immunis* **(Lutz, 1918) as Intermediate Host of** *Schistosoma mansoni* **in Santos, São Paulo**] *Mem. Inst. Butantan.* 1953, v. 25, No. 1, 175–6.

This is of interest to the systematist. Lutz in his original paper called this snail *Planorbis confusus*; in 1928, stating that *confusus* was preempted, he renamed it *P. immunis*. In 1938, Vianna Martins identified it with *Australorbis glabratus*. The present authors found among many Planorbidae sent in from various parts of Belo Horizonte no *A. immunis* (based on the description of the shells and genital apparatus) but *A. glabratus* only. Studying the Planorbidae of Santos they found many infected with larval forms of *S. mansoni*, and Coutinho identified them as *A. glabratus*. The authors, examining the shells, the digestive, renal and genital anatomy, concluded that there are 2 species of *Australorbis*; the most abundant and most infected they identified as *A. immunis*. The other, less common, corresponded with *Planorbis nigricans* Spix or *A. bahiensis* Dunker. This species abounds in São Paulo, but has not been found infected. It is distinguished by a greater height of the spirals of the shells, by marked umbilication of the right side, as in *A. glabratus olivaceus*, and on the left side by sharp, not rounded, angles. *A. immunis* and *A. g. olivaceus* are not easily distinguished by the shells, but specimens, even the largest, rarely attain a diameter of 25 mm., and the kidney shows distinct differences. *A. glabratus*, or its variety *olivaceus*, has a very marked renal crest which *A. minimus* has not, even vestigially.

H. Harold Scott

de Amorim, J. P., da Rosa, D. & de Lucena, D. T. Ratos silvestres, reservatórios do *Schistosoma mansoni* no Nordeste do Brasil. [**Wild Rats as Reservoir Hosts of** *Schistosoma mansoni*] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1954, Jan., v. 6, No. 1, 13–33, 9 figs. [19 refs.] English summary.

Brumpt in 1949 [*Précis de Parasitologie*, 6th ed.; this *Bulletin*, 1950, v. 47, 573] stated that man is the only host of *Schistosoma mansoni* but

Cameron in 1928 found *Cercopithecus sabaeus* infected in nature in St. Kitts [see this *Bulletin*, 1929, v. 26, 533]. In 1952, one of the authors of the present article, de Amorim, found in the faeces of field-mice lateral-spined ova and the same in the livers and spleens of *Nectomys squamipes*, *Holochilus sciureus* and *Oxymycterus angularis*. Others, *Rattus rattus frugivorus* and *Cercomys cunicularis inermis*, could be experimentally infected. The authors have, therefore, undertaken the examination of rats in Alagoas to verify these findings. They preface their remarks by a tabular representation of the Rodentia. In 3 municipalities of Alagoas State, Viçosa, Quebrangulo and Palmeira dos Indios, they examined rats in 19 localities of the first and found infected animals in 16 of them; in 1 of 6 localities in the second and in 1 in 5 of the third, *i.e.*, in 18 of the 30 localities examined. Altogether 737 animals were caught and examined, belonging to 10 genera and 12 species and 63 were found infected (8·5 per cent.). In order of importance (*i.e.*, numbers infected) were *Nectomys squamipes*, *Holochilus sciureus* and *Oxymycterus angularis*, and, to a much smaller degree, *Zygodontomys pixuna* and *Oryzomys subflavus*. Though not the most numerous, the first two are the most dangerous because of their wide distribution.

Tables are presented to show the species of rats caught in different localities, the numbers examined and the numbers positive; another showing in 18 localities the species of rodents examined and the numbers positive in each; a third gives the numbers in 3 districts of the Viçosa municipality of persons whose faeces were examined for ova, of rats of major epidemiological importance examined and found positive and the numbers of *Australorbis* found infected among those examined. In a fourth table are shown the results of examination of rat tissues, especially the liver and mesenteric veins, for ova or adult worms. In those localities where the positive rats were found human infection rates are high. *H. Harold Scott*

Ruiz, J. M. Preparo do antígeno para intradermo-reação na esquistossomose. [**Preparation of Antigen for the Intradermo-Reaction in Schistosomiasis**] *Mem. Inst. Butantan.* 1953, v. 25, No. 1, 5–13. English summary.

The basic principle of the new technique is the obtaining of a product of a highly purified nature, the active substance being contained in the polysaccharide fraction which is not soluble in a mixture of absolute alcohol and sulphuric ether, but from which the lipoid and protein fractions are eliminated. The details of the author's process are as follows.

Adult worms are obtained by perfusion of the liver and mesentery of experimentally infected guineapigs and collected in normal saline in a Petri dish. In a beaker of 20–30 ml. capacity they are then placed in 15–20 ml. of absolute alcohol and sulphuric ether in equal parts. The numbers of worms of each sex are noted (the reason for this will appear later); the vessel is kept covered at room temperature. After an interval up to 24 hours the fluid is drained off. The last drops on a filter paper react strongly with osmic acid. The worms are dried *in vacuo* during half an hour (they dry very quickly). They are then transferred to a sterile centrifuge tube and triturated with a glass rod to a fine powder. This part of the operation must be carried out carefully as the dried worms " may be projected to some distance under pressure of the rod ". To the powdered worms are added 10–15 ml. of alcohol-ether and, after thorough shaking, the product is left for 1–2 hours. The fluid is then again drained off and the powder dried afresh *in vacuo* for 10–15 minutes. The residue, as before, gives a

positive reaction for lipoids. To the dried powdered worms is added the extracting fluid, Coca's solution merthiolated at 1:5000 or 1:10,000 in a proportion of 1 in 200 according to the formula $\frac{82M + 23F}{5000} = N$ where N is the quantity of extracting fluid in ml. and 82 and 23 are the average weights of the dried male and female worms respectively in μgm., and M and F the number of worms used. The whole is centrifuged at a high rate for 20 minutes. The resultant supernatant is clear and colourless and is put up in sterile ampoules.

Five degrees of reaction may be obtained: (i) a papule equal to or only slightly larger than a control with the Coca merthiolate—negative; (ii) papule with smooth, regular border, less than twice the size of the control—doubtful; (iii) papule twice the size of the control—one plus; (iv) papule three times the diameter of the control, with irregular border, or twice the size with definite pseudopodia—two plus; (v) papule more than thrice the diameter of the control, or, if a little less, with long pseudopodia—three plus.

Tested against Meyer and Pifano's antigen [see *Rev. Sanidad y Asistencia Social*, Caracas, 1945, v. 10, 3–44, and *Archivos Venezolanos de Patol. Trop. y Parasit. Méd.*, 1949, v. 1, 1–35, see also Fairley and Williams, this *Bulletin*, 1928, v. 25, 458], in 89 patients 11 of whom were known to be infected, 67 were suspected and 11 known not to be infected, the results with the 2 antigens agreed entirely, " but the new antigen has shown [itself] to be slightly more sensible and specific ". Moreover, it is claimed that the new antigen is not only more easily prepared but is purer than that of Meyer and Pifano. *H. Harold Scott*

Meira, J. A. Esquistossomose mansoni. [**Schistosomiasis mansoni**] *Arquivos Facul. de Hig. e Saúde Pública Univ. de São Paulo.* 1953, Dec., v. 7, No. 2, 187–230, 11 figs. English summary.

In 1951 the author wrote his professorial thesis for the University of São Paulo on this subject and this was fully reviewed in this *Bulletin* [1952, v. 49, 737]. Another thesis on the same subject was delivered by Professor C. B. Dias of the University of Minas Gerais in the following year; this also was reviewed in detail [*ibid.*, 1953, v. 50, 365]. The present article by Professor Meira goes into similar details of another 28 patients with *Schistosoma mansoni* infection and the liver and spleen involvement. There is no need to go into so much detail again, the cases repeat largely what was reported before and the reader may be referred to that. Of these 28 patients 16 were treated by simple splenectomy and 12 by spleno-renal anastomosis subsequently. This new series, says the author, should be compared with his previous records for studying the differences between them. Much of the detail is presented in the form of tables stating the most common symptoms associated with the condition, the clinical picture and physical signs, the results of laboratory examinations, the blood changes and so on. Diagnosis was confirmed in most by faecal examination and rectal biopsy and, rather unexpectedly, the former proved the better. Of 26 cases in which these were carried out, in 13 the faeces were positive, but biopsy negative; in 8 both were positive; in 3 both were negative and in 2 only was faecal examination negative and biopsy positive. The intradermal reaction with antigen prepared from adult worms was positive in all of 10 cases in which it was tried. Other tables give details of liver function tests and the results of blood examinations and of the serum albumin and globulin. The spleen changes are secondary to the hepatic lesions which

result in portal hypertension, though the spleen circulation is also probably affected by direct toxic action of the trematode. *H. Harold Scott*

Oliveira, E. de S., Pondé, A. & Milton, G. Ligadura do tronco celíaco. (Registo de um caso, em que foi praticada na forma hépato-esplênica da esquistossomose americana, em período descompensado.) [**Ligature of the Coeliac Artery in a Case of** *S. mansoni* **Infection in Hepato-Splenic Form with Decompensation**] *Arquivos Univ. Bahia Facul. de Med.* 1953, v. 9, 25–31. [12 refs.]

The English summary appended to the paper is as follows:—

"The authors present a case of decompensated hepatosplenical form of Schistosomiasis mansoni treated by ligation of the coeliac artery. Ascites is no more reproduced since five months after operation, the time which the patient was observed in the Hospital."

Payet, M., Berte, M., Camain, R., Pene, P. & Plan, C. Coeur pulmonaire aigu bilharzien, à propos de deux observations. [**Two Cases of Acute Cor Pulmonale due to Schistosomiasis**] *Bull. Méd. de l'Afrique-Occidentale Française.* 1953, v. 10, 83–8. [18 refs.]

Meleney, H. E. & Moore, D. V. **Observations on Immunity to Superinfection with** *Schistosoma mansoni* **and** *S. haematobium* **in Monkeys.** *Exper. Parasit.* New York. 1954, Mar., v. 3, No. 2, 128–39. [13 refs.]

Although the serological reactions of the definitive host to schistosome infections and skin reactions to antigens have been investigated extensively, there have been fewer studies on immunity to superinfection following initial infection, an important consideration in endemic areas. The authors describe a series of observations on 4 monkeys subjected to various types of superinfection.

One monkey (*Pithecus mordax*) was exposed 5 times to bisexual infections with *Schistosoma mansoni* at varying intervals over a period of several years. Eggs appeared in the faeces after the initial exposure, but this was followed later by spontaneous cessation of egg excretion. Four subsequent re-exposures of the animal did not result in the reappearance of eggs in the faeces and autopsy, 7½ years after initial infection and 7 weeks after the fourth re-exposure, revealed that although there was marked fibrosis of the liver there was no evidence of eggs or worms in the viscera. It is concluded that complete immunity to repeated re-infections with *S. mansoni* had occurred.

The second monkey (*Macaca mulatta*) was exposed on 2 occasions, with a 17-months' interval between each exposure, to *S. haematobium* infection. After a further 22 months, a single exposure to bisexual infection with *S. mansoni* was made. Eggs appeared in the faeces and urine after the initial infection with *S. haematobium*, but egg excretion ceased spontaneously several months later. After re-exposure to *S. haematobium* eggs did not re-appear in the excretions; immunity to reinfection with the same species of schistosome is believed to have occurred. Following the subsequent exposure to *S. mansoni*, however, normal development of these worms took place and a normal pattern of egg production followed. At autopsy, one year after the *S. mansoni* exposure, minimal egg lesions from that infection were noted in the liver and intestines. Many *S. mansoni* worms, but no

S. haematobium, were recovered from the mesenteric-portal veins. There was, therefore, a lack of complete immunity to the *S. mansoni* infection, but the smaller average length of recovered worms and evidence of atrophy of ovaries and vitellaria which was observed in the females lends support to the suggestion of a slight immunizing effect from the previous *S. haematobium* infections.

In the remaining two experiments one *Macaca mulatta* was exposed to female cercariae and 11 weeks later to male cercariae of *S. mansoni*, while another was exposed to male cercariae followed 12 weeks later by female cercariae of *S. mansoni*. Eggs appeared in the faeces of these monkeys after the normal pre-patent interval. At post-mortem examination active egg lesions were found in the viscera and normal adult worms were recovered from the mesenteric-portal veins. It is concluded that infection with one sex of *S. mansoni* does not produce immunity against normal development of the other sex.

This paper also contains interesting information on the skin reactions of monkeys following exposure to schistosome cercariae. Observations on skin penetration indicated that some cercariae remained in the epidermis as long as 72 hours after application. They were rarely found in the deeper skin structures, however, and the suggestion is made that those cercariae which penetrated to the deeper tissues usually gained entrance rapidly into the lymph or blood vessels. The authors believe that in immune animals cercarial destruction probably takes place in the visceral blood vessels at a later stage of development.

The serum of the second monkey under experiment, after its second exposure to *S. haematobium*, and the serum of the third monkey, during the course of its unisexual female infection and after the addition of the male infection, were investigated for schistosome antibodies by the *Cercarienhullen Reaktion* [CHR test] of Vogel and Minning [this *Bulletin*, 1949, v. 46, 1154], with the cercariae of the 3 schistosomes of man. The results demonstrated the presence of serum antibodies which were not species-specific. — *R. B. Griffiths*

Ruiz, J. M. Esquistossomose experimental. 3. *Cuniculus pacca pacca* e *Grison furax*, novos animais receptíveis à infestação pelo *Schistosoma mansoni*. [**Experimental Schistosomiasis. Receptivity of** *Cuniculus pacca pacca* **and** *Grison furax* **to** *S. mansoni* **Infection**] *Mem. Inst. Butantan.* 1953, v. 25, No. 1, 23–6.

The English summary appended to the paper is as follows:—

"One specimen of *Cuniculus pacca pacca*, paca and three specimens of *Grison furax*, furão were experimentally infected by *Schistosoma mansoni*.

"*Cuniculus pacca pacca* was infected with approximately 600 cercariae cutaneously. Viable eggs were found in stools 57 days after exposure to infection and were evacuated regularly during the observation time. The necropsy made 118 days after infection revealed 24 males and 10 females of adult *S. mansoni*.

"*Grison furax* were infected with unknown number of cercariae. Collective stools examination revealed *S. mansoni* eggs at the 56th day of infection. Elimination of viable eggs was observed to be very regular in those animals.

"Necropsy of *Grison furax* specimens were made 57, 74 and 103 days after infection and the following adult worms were recovered: 137 males and 13 females, 182 males and 4 females and 310 males and 16 females respectively."

Jarpa, A. & Hermosilla, F. Un caso de distomatosis hepática. [**A Case of Hepatic Distomatosis**] *Bol. Chileno de Parasit.* 1954, Apr.–June, v. 9, No. 2, 64–5. English summary (7 lines).

Vogel, H. & Falcão, J. Über den Lebenszyklus des Lanzettegels, *Dicrocoelium dendriticum*, in Deutschland. [**Life Cycle of the Lancet Fluke *Dicrocoelium dendriticum* in Germany**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1954, July, v. 5, No. 3, 275–96, 6 figs. [19 refs.]

Koppisch, E., Marcial Rojas, R., Cordero, R. & Guzmán López, L. Primer caso autoctono de cisticercosis en Puerto Rico. Informe de un caso con hallazgos necropsicos. [**First Autochthonous Case of Cysticercosis in Puerto Rico. Diagnosis at Autopsy**] *Bol. Asoc. Méd. de Puerto Rico.* 1954, May, v. 46, No. 5, 185–97, 7 figs.

The English summary appended to the paper is as follows:—

" The first autochthonous case of cysticercosis in Puerto Rico is reported. It was of cerebral type, with clinical manifestations of an intracraneal tumor. Death took place shortly after an exploratory craniotomy, and the diagnosis was established at autopsy. Six cysts were found, all of them basally situated, in the leptomeninges, with the exception of one, which was found between the right temporal lobe and the insula of Reil, and another situated in the leptomeninges to the left of the medulla oblongata. The patient came from Morovis, a region where it has been known for several years that cysticercosis is found among hogs."

Rhodes, P. L. **Unusual Case of Hydatid Cyst of the Brain.** [Memoranda.] *Brit. Med. J.* 1954, Sept. 25, 739.

The author records the rupture of a hydatid cyst of the brain of a child aged 3½ years, which resulted in the child's death on the day on which the symptoms began.

The author states that primary hydatid cysts of the brain are rare and their distribution in children is 4·3 per cent. as compared with 0·7 per cent. in adults, the distribution of hydatid cysts in other situations in children being liver, 76·2 per cent. and lung, 11·1 per cent.

The author saw the patient almost as soon as the symptoms developed. At 8.30 a.m. sudden vomiting occurred after several convulsions during the previous hour. Slight convulsions went on almost continuously, with marked convulsive movements of the right arm and continuous twitching of both the left arm and leg. The child lay on the left side with the left elbow and knee flexed. The temperature was then 100·2°F. and the pulse 100. There was marked nystagmus of the eyes to the left and rigidity of the neck. Knee and ankle reflexes were brisk and increased, abdominal reflexes being absent. Lumbar puncture showed colourless fluid under considerable pressure, with white cells 8 per cmm., scanty red blood cells and lymphocytes, no organisms, sugar present, globulin not in excess, protein 20 mgm. per 100 ml., and chlorides 700 mgm. per 100 ml. By 11.30 a.m. the temperature was 104°F. and the pulse 110. The convulsions continued. At 2 p.m. the temperature was 107·8°F. and the pulse imperceptible. At 2.40 p.m. 4 ml. paraldehyde were given in an attempt to lessen the convulsions, the temperature being then 105·2°F. At 3 p.m. the temperature was 105°F. and the child's condition was much worse.

The twitching of the limbs continued and the child still lay on the left side with the left elbow and knee flexed. At 3.40 p.m. she died.

Post-mortem examination showed a large, whitish, hydatid cyst about 8 cm. in diameter arising from the dura and pressing upon the left parietal and frontal lobes. The brain substance was not involved. The cyst was leaking an opalescent fluid and much free fluid was present. The cyst wall had a smooth outer surface studded with whitish papules. Scolices of *Echinococcus granulosus* were found in fluid taken from the cyst and the cause of death was rupture of the cyst. Enquiry showed that before the family had moved to their new house they had lived in rooms where the owner kept a greyhound that had died of worms. Casoni's tests carried out on both parents and their son, aged 5½, were negative. The report comes from the Bridgnorth and South Shropshire Infirmary. *G. Lapage*

Blum-Gayet, J. Essai sur les nématodes antillais de deux anthelminthiques encore peu utilisés dans les pays de langue française. [**Trial on the Nematodes of the Antilles of Two Anthelmintics hitherto little used in French-speaking Countries**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 2, 286–8.

The author gives the following results of an enquiry made among the doctors of Martinique:

(1) Most of the population are infected with helminths, often with more than one species, the species most often encountered being, in decreasing order, *Ascaris*, *Necator americanus*, oxyurids, *Trichuris*, schistosomes and "anguillules".

(2) Variations occur according to (a) age, *Ascaris* being commoner in the young and ankylostomiasis in the older patients; (b) locality, massive infections occurring in people living under poor economic conditions or with rudimentary hygiene, digestive troubles and frequent re-infections; schistosomes are commoner in the northern part of the island.

(3) No local work has been done on the relative value of anthelmintics.

(4) Oil of chenopodium gives the best results in the treatment of ascariasis; for *Necator americanus* neither thymol nor oil of chenopodium gives quick or efficacious results; tetrachlorethylene is not available and other anthelmintics have been tested only sporadically and with poor results.

The author tried diphenylpiperazine and hexylresorcinol for ascariasis and ankylostomiasis. Each patient was examined once before treatment and once 4–6 days after each treatment. Of 20 patients given diphenylpiperazine for ascariasis [the dosage is not stated], 16 were negative after one treatment, and 2 after two treatments, 2 remaining positive after two treatments. Thus treatment was successful in 80–90 per cent. of cases without purgation or other special measures.

Of 20 patients infected with *Necator americanus*, all of them more or less anaemic, feeble and emaciated, 13 were negative after treatment with 1 gm. of hexylresorcinol in one dose, 5 were negative after two doses with an interval of 10 days between them, one was negative after 3 doses at intervals of 10 days and one was positive after 2 doses. The dose of hexylresorcinol was given in the form of 5 pills taken with water on an empty stomach in the morning, after a light meal the evening before, followed by 5 hours of dieting and a purge 24 hours after the dose. One adult only had nausea and vomited, but he probably took food during the 5 hours after treatment. For ambulatory patients it seems desirable, after a very light evening meal

(milk and biscuits) to give the dose at 2–3 a.m., so that breakfast can be taken as usual and the rest of the day can be normal. The author therefore recommends piperazine for ascariasis and hexylresorcinol for ankylostomiasis as active, readily-absorbed drugs of little toxicity. *G. Lapage*

Sadun, E. H., Vajrasthira, S. & Maiphoom, C. **The Effect of Treatment and Sanitation on Hookworm Infection in Cholburi Province (Central Thailand).** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 764–72, 5 figs. [11 refs.]

The effects of hookworm control methods were measured by changes in the incidence and intensity of infection in a village consisting of 8 communes separated by rice fields. After a propaganda campaign latrines were constructed by the villagers themselves, only technical advice being given. In the population of about 2,500 people 181 privies were built, approximately one for every 2 to 3 dwellings. A similar village nearby was left unchanged as a control. Stool specimens collected from samples of the population were examined by salt-flotation, and if positive they were re-examined and the egg-count determined. Before construction of the privies the infection rate was 83 per cent., with an average count of 1,440 eggs per gm. After latrines had been installed for 12 to 14 months the infection rate was 73 per cent., with an average egg-count of 780. In the control village a reduction in the average egg-count, but not in the infection rate, was noted, possibly due to the measures taken in the neighbouring village.

The effect of treatment with a single dose of anthelmintic drug was also studied. In two communes of the village given sanitation 72 persons dwelling near a newly constructed latrine were treated and 63 persons with comparable infections were selected as controls and left untreated. Six days after treatment 65 per cent. were free of infection and the total worm burden was reduced by 96 per cent. In these two communes a year after latrine construction the general incidence of infection had not changed though the average egg-count had dropped from 1,610 to 670, but among those treated the combination of treatment and sanitation resulted in a reduction in incidence from 100 to 67 per cent. and a drop in egg-count from 1,720 to 490. It is suggested that a combination of sanitation and mass treatment represents the best method of attack on hookworm in Thailand. *T. H. Davey*

Silva, R., Donoso, F. & Neghme, A. Consideraciones epidemiológicas sobre *Ascaris lumbricoides* en Chile. I.—Estudio en la región lacustre de Chile. [**Epidemiological Considerations on *Ascaris lumbricoides* in Chile**] *Bol. Chileno de Parasit.* 1954, Jan.–Mar., v. 9, No. 1, 6–10. [12 refs.]

The English summary appended to the paper is as follows:—

"A report is given on the epidemiology of *Ascaris lumbricoides* infection in the lake zone of Chile, between 40° 10′ and 41° 20′ South latitude. 2,118 individuals of both sexes, and of a low social condition were surveyed. This study showed a prevalence of the infection of 56·65%, which is one of the highest reported in the literature all over the world. Important factors in this high endemicity are: (a) poor environmental sanitary conditions: high grade of soil pollution by human faeces; contaminated drinking

water, etc.; (b) weather conditions: high humidity and moderate temperature which favour the development of *A. lumbricoides* eggs; and (c) defective sanitary habits of the population."

Neghme, A., Silva, R. & Donoso, F. Consideraciones epidemiológicas sobre *Ascaris lumbricoides* en Chile. II. La Ascaridiasis en la zona norte del país. [**Epidemiological Considerations on** *Ascaris lumbricoides* **in Chile. II. Ascaridiasis in the North Zone**] *Bol. Chileno de Parasit.* 1954, Apr.–June, v. 9, No. 2, 47–50.

The English summary appended to the paper is as follows:—

"Epidemiological surveys in the north of Chile show a low prevalence (1 to 7%) of *Ascaris lumbricoides* infection. This is surprising if we consider the high prevalence of the infection in other zones of the country and the poor environmental sanitation and deficient sanitary habits of the population in the surveyed area. The unfavourable climatic conditions for the development of *Ascaris* eggs (low degree of humidity, dried soil) may explain this low prevalence. Only one exception was found; the high prevalence of La Serena (23·35%) which may be explained by different climatic conditions plus a high percentage of foreign population."

Khalil, H. A. **Complications due to Ascariasis.** Literature and Case Report. *J. Egyptian Med. Ass.* 1954, v. 37, No. 6, 706–19, 4 figs. on 2 pls. [43 refs.]

Erhardt, A. Chemotherapeutische Untersuchungen mit Hetrazan. [**Chemotherapeutic Studies with Diethylcarbamazine**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1954, July, v. 5, No. 3, 302–5. [25 refs.]

The English summary appended to the paper is as follows:—

"Hetrazan showed distinct healing properties in cat ascariasis when given orally or intraperitoneally. The useful dosage, however, produced toxic symptoms like vomiting. For hookworm and infections of cats, also for trichinosis of rats and oxyuriasis of rabbits, hetrazan proved inadequate in the dosage tried."

Barrera Moncada, G. Tratamiento enzimático (papaína) de algunas parasitosis intestinales. Primeros resultados en Venezuela. [**Papain in the Treatment of Intestinal Parasites (in Venezuela)**] *Archivos Venezolanos Puericult. y Pediat.* 1953, July–Sept., v. 16, No. 49, 391–402. English summary.

The parasites referred to are the 3 nematodes *Ascaris lumbricoides*, *Necator americanus* and *Trichuris trichiura*. The anthelmintics commonly used have certain drawbacks; they may be toxic to man, they tend to be selective in action and they give irregular results; in other words they are not altogether reliable.

The present article tells of the use of the German preparation Vermizyn which contains papain, ascorbic acid, dried yeast, calcium carbonate and an excipient. Papain is the dried milky juice of the fruit of *Carica papaya*, the papaw. For children under 10 years of age it is given in the form of

comfits each containing 44·255 per cent., and for adults tablets each containing 208 mgm. The ages of the patients treated ranged from 1 to 20 years, but only 2 of the 38 treated were adults. Twenty-four were in good general health, the others were anaemic and wasted; red cells in one were as low as 2 million per cmm., haemoglobin 19 per cent. (3·1 gm.) and eosinophiles 20 per cent. Of the total cases, 13 had *Ascaris* only, 21 *Ascaris* and *Trichuris*, 1 *Ascaris*, *Necator* and *Trichuris*, 2 *Trichuris* only and 1 *Trichuris* and *Necator*.

Treatment at first was by a single day's dose, 210 comfits for the children and 25 tablets for adults, but if the faeces still contained parasites, after an interval of 1–2 weeks, a second treatment was given over 2–3 days, with a total of 400–600 comfits or 50–75 tablets. No purgative was given, either before or after treatment, to children under 8 years of age; the others took a laxative the evening preceding treatment. On the treatment days and for "a few days after" no meat or eggs were allowed. The medicine was generally well tolerated; 2 adults complained of slight nausea and 1 child of 2½ vomited the drug on various occasions.

Two tables are given; one showing the names, ages, weights, heights and general condition, the other giving the parasites present in each, the days and dosage of treatment and the results of subsequent examination of the stools. In more than half (57 per cent.) the worms were all expelled and examination of the faeces on 3 or 4 occasions revealed neither worms nor ova in 65 per cent. It is thought that with more thorough preparation and longer courses of treatment complete success might be attained.

H. Harold Scott

Rosen, L. **Human Filariasis in the Marquesas Islands.** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 742–5. [15 refs.]

In June 1952 the author visited the 6 inhabited islands of the Marquesas group in Polynesia to make brief filariasis and mosquito surveys. In each of the islands (Nukuhiva, Uahuka, Uapou, Tahuata, Hivaoa and Fatuhiva), which have a total population of 3,000, at least 5 per cent. of the people had gross manifestations of elephantiasis. On each island there were persons with the disease who had never lived elsewhere and in addition several Europeans were affected. Stained blood films (20 cmm. of capillary blood) were taken in the daytime from inhabitants of Fatuhiva and 32·2 per cent. were positive for microfilariae of *W. bancrofti*.

Aëdes polynesiensis was found on all 6 islands. As coconuts opened by rats are the most important breeding sites of the mosquito in these islands it is interesting to note that two of the islands are free from this rodent. It has been assumed that mosquitoes of the *Aëdes scutellaris* group were present before the advent of man [Buxton, this *Bulletin*, 1929, v. 26, 436] or that they were carried from island to island by the Polynesians before the arrival of Europeans [*ibid.*, 1950, v. 47, 64]. However, examination of early data reviewed by the author is claimed to indicate that neither filariasis nor *Aëdes scutellaris* mosquitoes existed in that area until relatively recent times. Although it is not possible to state precisely when human filariasis became endemic in this archipelago, current opinion of local inhabitants that elephantiasis has been present only in the last 50 years appears to be substantiated.

Philip Manson-Bahr

See also p. 1305, Rosen & Rozeboom, **Morphologic Variations of Larvae of the *Scutellaris* Group of *Aedes* (Diptera, Culicidae) in Polynesia.**

Rachou, R. G. Filarioses nas Capitais Brasileiras. [**Filariasis in Brazilian Capitals**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1954, Jan., v. 6, No. 1, 35–40. [21 refs.]

The English summary appended to the paper is as follows:—

"The author presents summarily what is known about the incidence of filariasis in 25 Brazilian Capitals. In 7 of these, there are autochthonous cases: Manáus (*ozzardi* and *bancrofti*), Belém, Recife, Maceió, Salvador, Florianópolis and Pôrto Alegre (*bancrofti*). Belém, in the north of the country, is the most important *focus* of bancroftiasis, presenting estimatively 30,000 cases."

Rachou, R. G., Costa, J. L. & Martins, C. M. Variação do número de microfilárias de *Wuchereria bancrofti* em 3 amostras de sangue, colhidas uma imediatamente após outra, em uma mesma punção digital. [**Variation in the Number of Microfilariae of** *W. bancrofti* **in 3 Samples of Blood taken consecutively from the Same Finger Puncture**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1954, Jan., v. 6, No. 1, 53–61.

The English summary appended to the paper is as follows:—

"The authors made 274 observations with 27 persons with microfilaraemia of *Wuchereria bancrofti*, collecting in each observation, from the same digital puncture, 3 samples of 20 cmm. of blood, one immediately after the other. They verified in several observations a great variation of the number of microfilariae in the 3 samples of the same observation; however, the total results of each sample have not shown significant differences. With samples of 20, 40 and 60 cmm of blood they obtained microfilaria rates, respectively, of 83·6%, 90·5% and 95·3%; a greater variation of this index was obtained among the samples proceeding from a locality with lower incidence of bancroftiasis (78·3% in the first sample, 87·0% in the second and 93·2% in the third). In spite of the higher microfilaria rate and microfilaria density obtained with larger samples (40 or 60 cmm), the authors, attempting to the facilities of collection, the quickness of examination and the cost, factors to be considered in large programs as the Filariasis Program of Brazil, conclude that the sample of 20 cmm of blood for hemoscopic surveys is satisfactory and should be maintained."

Dassanayake, W. L. P. & Chow, C. Y. **The Control of** *Pistia stratiotes* **in Ceylon by means of Herbicides.** *Ann. Trop. Med. & Parasit.* 1954, June, v. 48, No. 2, 129–34, 1 map.

The areas of Ceylon in which filariasis is endemic are shown on a map. In all these areas *Wuchereria malayi* is endemic only in those villages situated close to water heavily and perennially infested with the water lettuce *Pistia stratiotes* [this *Bulletin*, 1938, v. 35, 759]. Of all the 24 plants listed as being associated with mosquitoes of the genus *Mansonia*, *Pistia stratiotes* is the most important; epidemiological observations and mosquito dissections indicate that *Mansonia uniformis*, *M. annulifera* and *M. indiana* are the chief vectors of rural filariasis.

The manual removal of *Pistia* plants has proved to be unsatisfactory and recently field experiments with 5 herbicides have been undertaken. From the results of these experiments the authors conclude that the most effective, cheapest and easiest herbicides to handle are Phenoxylene 30 and Shell Weedkiller D; only Phenoxylene was locally available in sufficient quantity for large-scale application. The effective dose was 1–2 fluid ounces with 1 fluid ounce of a wetting agent to each gallon of water, applied at the rate

of 36 gallons per acre. *Pistia* so treated died within 5–10 days. The cost was 20 rupees per acre, about one-sixth of the cost of removal of the plant by hand. Two annual applications seem to be sufficient and they should be made preferably when the water is low enough to allow the labourers to cover a whole tank on foot. The herbicide is most effective against young plants but has no effect on seeds.

No ill effects were reported in man or animals and no complaints were received from the operators.

Chemical spraying has now replaced manual removal for the control of *Pistia* throughout Ceylon. *H. S. Leeson*

Dassanayake, W. L. P. **The Control of Mosquito-Breeding in Husk-Pits by Naturalistic Methods.** *Ann. Trop. Med. & Parasit.* 1954, June, v. 48, No. 2, 127–8, 4 figs. on pl.

"1. The pits employed in Ceylon for soaking coconut husks for the extraction of their fibre breed mosquitoes in very large numbers, particularly *Culex fatigans*, the local vector of *Wuchereria bancrofti*.

"2. Naturalistic control of mosquito-breeding in such pits can be achieved by constructing them on the margins of rivers or on the beach close to the sea, where they are in moving water.

"3. This method is cheap, and is suited to the simple requirements of individual households unable to afford the cost of machinery for the extraction of the fibre.

"4. Siting the pits in such places controls bancroftian filariasis and eliminates the noxious smells associated with soaking the husks in stagnant water."

Charles, L. J. **Toxicity of the Botanical Insecticide** *Ryania speciosa* **to** *Culex pipiens fatigans* **Wied.** *Bull. Entom. Res.* 1954, June, v. 45, Pt. 2, 403–10.

By the end of 1951 by using residual DDT British Guiana had successfully eradicated mosquitoes transmitting malaria and urban yellow fever from the coastal zone. There remained the difficult problem of *Culex pipiens fatigans*, the vector of filariasis. As it appeared that residual insecticides could not control the adult it seemed that measures against the larvae would be required. Important breeding places are waterlogged pit latrines.

In the present paper the author studies the possibility of using extracts of stems of the shrub *Ryania* which is indigenous to the northern part of South America and has been shown to possess high insecticidal activity against some species of insect. The conclusion is that extracts of the stem of the shrub contain something which is fatal to larval stages of *Culex*. The author's stock solution retained its powers of killing for at least a month and when more diluted remained effective for a shorter period. The amount of crude extract required to kill larvae was surprisingly high but this perhaps does not matter if the raw material is always available and cheap. A much more serious matter is that in the presence of much organic matter, such as would presumably occur in a pit latrine, the insecticidal effect is greatly reduced. The author concludes that this material is not likely to be of value in his particular problem though he does not appear to have tested it in the field. Used as a contact insecticide he concludes that *Ryania* is entirely non-toxic and that the watery extract does not kill the adult mosquito.

It is a matter of interest that there is a large difference in the amount of crude extract required to produce an LD50 in two strains of larvae of *Culex*, one from a colony which has been maintained for a long time in the laboratory and the other wild. The wild larvae came from an area where house-spraying by DDT had been carried out for a number of years and required a much heavier dose of insecticide to kill them. *P. A. Buxton*

Deschiens, R. & Pfister, R. Sur une microfilaire observée dans le sang de l'homme en Haute Volta. [**A Microfilaria observed in the Blood of a Man in the Upper Volta**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 2, 278–81, 2 figs. on pl.

During the examination of 10,000 blood films by the thick-film method at Bobo-Dioulasso, Pfister found, in two patients, microfilarial larvae whose structure and size did not agree with those of any known microfilariae. One patient came from the village of So in Djibo, Ouahigouya, the other from the village of Bagla in Diebougou, Gaoua. Neither patient showed infection with *Wuchereria bancrofti* or *Dipetalonema perstans*, but both had the same atypical microfilariae described in this paper. These microfilariae were rare. They had the constant form of a cross or a horseshoe and are shown in microphotographs. The anterior and posterior ends were rounded, the posterior end terminating in a small narrow cone. The larvae were 250–270 micra long and 20–21 micra broad. They were, that is to say, very thick-set, a feature that distinguished them from all known human microfilariae. Stained with the Romanowsky stain the somatic nuclei were small, rather irregular and often elongated and flattened. At the anterior and posterior extremities there were 4 clear spots, of which 3, namely, a precephalic one, one at the junction of the anterior and second quarters and one in the hindmost quarter, were quite precisely defined. The larvae had a short, serrated sheath without any anterior or posterior expansions.

These features distinguish these larvae from the microfilariae of *W. bancrofti* and *Loa loa*. The authors reject the view that they might have been the microfilariae of these species rendered atypical or monstrous by therapeutic agencies, because these two patients had not been treated. They give their reasons for distinguishing the microfilariae found from various other microfilariae seen in the blood of man, monkeys and the ox. Provisionally they give to these microfilariae the name *Microfilaria soudanica*, n.sp. *G. Lapage*

Kershaw, W. E., Duke, B. O. L. & Budden, F. H. **Distribution of Microfilariae of *O. volvulus* in the Skin. Its Relation to the Skin Changes and to Eye Lesions and Blindness.** *Brit. Med. J.* 1954, Sept. 25, 724–9, 2 figs.

"The concentration and distribution of the microfilariae of *Onchocerca volvulus* in the skin were estimated in people in the British Cameroons and in Northern Nigeria by counting the number issuing in a wet film made from skin snips weighed on a torsion balance and taken from different parts of the body.

"The numerical distribution of the microfilariae was found to have a clear pattern, which in the Cameroons and in Northern Nigeria was related to the distribution and severity of the skin lesions and to eye changes and blindness.

"Possible reasons for this distribution are discussed, and, from the relation

to eye changes, conclusions are drawn concerning the possibility of the effective control of the infection and the prevention of blindness."

This interesting and important paper does not lend itself to further summarization and should be read in the original by those interested. The results recorded suggest the hope that control measures directed against the vector, even if insufficient to lower the incidence of the disease in the human population, may yet be successful in reducing or even eliminating the more serious complications of onchocerciasis. *R. M. Gordon*

See also p. 1298, Boithias, Incidence médico-militaire de l'onchocercose [**Incidence of Onchocerciasis in Military Medical Practice**].

See also p. 1298, Toulant & Boithias, Les lésions oculaires de l'onchocercose africaine [**Ocular Lesions in African Onchocerciasis**].

See also p. 1314, Lea & Dalmat, **Screening Studies of Chemicals for Larval Control of Blackflies in Guatemala.**

Norn, M. S. **Oxyuriasis. Demonstration of Threadworm Eggs by a New Modification of the Adhesive Cellophane Method.** *Danish Med. Bull.* 1954, Mar., v. 1, No. 1, 23–4, 5 figs.

The author considers that most of the numerous methods for demonstrating the presence of the eggs of *Enterobius vermicularis* are very unreliable. He describes, with line illustrations, his own modification of the adhesive Cellophane method [Norn, this *Bulletin*, 1954, v. 51, 623]. A strip of adhesive Cellophane about 5 cm. long is placed round the end of a glass rod and held there with the thumb and index finger while the patient's anal region is swabbed with the Cellophane. The Cellophane is then transferred to a slide. Before examination the Cellophane is lifted up and immersion oil is placed between it and the slide, the Cellophane then being replaced for examination. The *Enterobius* eggs then appear with a " shining radiance " in the optically clear preparation.

Examination of more than 600 persons by this method showed that this method revealed the eggs in 58 per cent. of the patients infected after one swabbing, in 80 per cent. after two and in 93 per cent. after three swabbings. The author considers that, to exclude enterobiasis with 97–99 per cent. accuracy, at least 4–5 swabbings are needed. Swabbing in the afternoon seems to give slightly inferior results, but it does not matter whether the swabs are taken early or later in the morning.

Examination of 609 persons chosen at random from children's institutions and others from medical wards [presumably in Kolding where the author works] by the method described above, showed that 26 per cent. were infected, the majority (74 per cent.) being of school age, with decreasing frequency towards higher and lower ages. The oldest patient was 78. Symptoms occurred in only a few cases, namely, pruritus ani in 6·8 per cent., compared with 5·1 per cent. in the control group, and anal irritation in 8·7 per cent. compared with 3·3 per cent. in the control group. Neither anaemia nor dyspeptic symptoms were observed. *G. Lapage*

Nairn, R. C. & Duguid, Helen L. D. *Oxyuris* **Granuloma of the Endometrium.** *J. Clin. Path.* 1954, Aug., v. 7, No. 3, 228–30, 3 figs. [10 refs.]

" A granuloma containing a gravid female threadworm was found during the routine histological examination of uterine curettings. The endometrial

stroma showed a striking infiltration by eosinophil granulocytes. It is believed that the granuloma reached its full development in not more than three weeks."

Bumbalo, T. S., Gustina, F. J. & Oleksiak, Rose E. **The Treatment of Pinworm Infection (Enterobiasis).** A Comparative Study of Three Oxyuricides. *J. Pediatrics.* St. Louis. 1954, Apr., v. 44, No. 4, 386–91. [12 refs.]

Investigations among patients at a hospital in Buffalo, NY, showed that 29 per cent. of 1,737 children were infected with *Enterobius vermicularis*. A number of anthelmintics has been tried, but none has proved entirely satisfactory [this *Bulletin*, 1953, v. 50, 838; 1954, v. 51, 505].

An investigation was undertaken with 3 anthelmintics in the treatment of 155 children, inmates of an orphanage in Buffalo. The diagnoses and tests of cure were made by the examination of Scotch tape swabs: 7 negative examinations, the first being taken 7 days after the last dose of anthelmintic, constituted the criterion of cure.

Of these children, 47 were treated by piperazine hexahydrate, 50 by terramycin [oxytetracycline], and 58 by dehydrated garlic.

Piperazine was given in the form of an emulsion containing 100 mgm. per ml. thrice daily for two periods of 7 days with a treatment-free interval of 7 days. The doses were half a teaspoonful for a child of 1 to 5 years, 1 teaspoonful for 5 to 10 years, and 1½ teaspoonsful for children 10 years and over.

The garlic was given in the form of a " mint-flavored syrup " containing 8 grains of dried garlic to the teaspoonful, in doses of 1 teaspoonful for children 1 to 10 years and 2 teaspoonsful for those 10 years and over, thrice daily for the same period as in the case of piperazine.

Terramycin was given in daily doses of 5 mgm. per pound bodyweight, divided, for the same period.

The cure rates produced by these three drugs were 85 per cent., 7 per cent. and 38 per cent., respectivly.

In view of the favourable reports on the treatment by garlic by other workers, the authors consider that there may have been some mistake in their own technique. The dosage of terramycin that they used was half that used in their earlier experiment when they obtained an 85 per cent. cure rate, and is obviously too low to be fully effective.

The percentage of cures obtained with piperazine hexahydrate was equal to that obtained with terramycin (full dosage) and with gentian violet, but as there are distinct advantages in the use of the first named, *e.g.*, relatively low cost and absence of danger of the production of sensitivity, and absence of troublesome side-effects, the authors consider piperazine hexahydrate (antepar citrate) the most practical remedy for *Enterobius vermicularis* infection so far used by them. [See also White and Standen, this *Bulletin*, 1954, v. 51, 86.] *L. E. Napier*

Askue, W. E. & Tufts, Emily, with the technical assistance of Vera Droughman. **Phthalylsulfathiazole (Sulfathalidine) in the Treatment of Enterobiasis (Pinworm Infection).** *J. Pediatrics.* St. Louis. 1954, Apr., v. 44, No. 4, 380–85, 1 fig. [11 refs.]

It has been shown that there is considerable parallelism between the effectiveness of anthelmintics in the treatment of infections by the threadworm (pinworm), *Enterobius vermicularis*, in man, on the one hand, and

the threadworm, *Aspicularis tetraptera*, in the mouse, on the other [this *Bulletin*, 1952, v. 49, 294, 790]. Phthalylsulphathiazole has been shown to be effective in the latter infection; an investigation of the effect of this drug in threadworm infection in children was therefore undertaken.

The subjects were both hospital and clinic patients. The phthalylsulphathiazole was given in two forms, as tablets and as an emulsion (Cremothalidine), and in several dose schedules. The results obtained in each of 8 series are analysed separately. In addition, an untreated control series (8 subjects) and a series in which gentian violet was used (6 subjects) are also included.

The emulsion proved most satisfactory for administration. The dose schedules were within the range recommended by the manufacturers; the maximum dose of Cremothalidine given was 8 gm. a day for 7 days or 6 gm. for 14 days, for children over 13 years. The criterion of cure was 7 consecutive negative Scotch tape (Cellophane tape) swabs. Of the 8 controls, 3 showed 7 consecutive negative swabs and would have been considered to be "cured". All the subjects on gentian violet were cured.

"1. Daily doses of Cremothalidine from 2 to 6 gm. given for two weeks cured twenty-three (79 per cent) of twenty-nine children in a children's hospital, and fifteen (47 per cent) of thirty-two in a clinic population of all ages. One to 8 gm. a day given for one week cured all five children in the hospital group, and five of eight (63 per cent) in the dispensary.

"2. Although not as potent an anthelmintic as gentian violet, Cremothalidine did not produce the gastro-intestinal irritation associated with the dye, and because of its palatable liquid form was much easier to administer to infants and small children.

"*Note*: Since the preparation of this paper, tablets each containing 0·2 gm. of neomycin and 0·3 gm. of sulfathalidine have been tried. Three to ten tablets given twice a day for seven days cured nine children with no treatment failures. Because fifteen of twenty-three individuals treated complained of anorexia, nausea, or vomiting, the effectiveness of smaller doses should be studied." *L. E. Napier*

i. Helvig, R. J. & Weaver, L. **Control of Trichinosis by Sanitary Garbage Disposal.** *J. Amer. Med. Ass.* 1954, Aug. 14, v. 155, No. 16, 1388–9.

ii. Moore, A. D. **Future of the Sanitary Landfill.** *Ibid.*, 1390–91.

iii. Bundesen, H. N. **Control of Trichinosis as a Public Health Measure.** *Ibid.*, 1392–3.

iv. Wright, W. H. **Control of Trichinosis by Refrigeration of Pork.** *Ibid.*, 1394–5. [10 refs.]

v. J. Amer. Med. Ass. 1954, Aug. 14, v. 155, No. 16, 1395–7. **Recommendations adopted by the 1952 National Conference on Trichinosis.** Amendments of the 1954 Conference, held in Chicago, March 1, 1954, appear in brackets.

i. The transmission of trichinosis by means of garbage may be controlled either by disposal in such a way that material infected with *Trichinella* is inaccessible to swine, or by destruction of the larvae before infected garbage is fed to animals. There are 5 methods of safe disposal, namely incineration; burial or sanitary landfill; grinding and disposal with sewage; composting; and reduction for the salvage of animal fats. Of these the first two are widely adopted. Destruction of *Trichinella* larvae in garbage can be accomplished by dehydration, reduction and cooking. The first two

of these are not economic, but the last is being increasingly adopted. The standard recommended requires a temperature of 212°F. to be maintained for 30 minutes but it is difficult to ensure that all those feeding garbage to swine observe it.

ii. As a result of United States legislation prohibiting the feeding of swine with raw garbage many municipalities are faced with the problem of garbage disposal and the method of choice is sanitary land-fill. One of the main difficulties is that of annexing a suitable site because the community can prevent compulsory purchase by voting against it. New legislation is required empowering municipalities to acquire suitable sites, for otherwise they will have to turn to incineration or other more expensive and less suitable methods.

iii. Although *Trichinella* larvae are demonstrable at autopsy in some 16 per cent. of the pork-eating population of the United States of America, few cases are diagnosed and fewer deaths ascribed to the infection. There must be many more cases than are reported. The control measures recommended are summarized as follows:—(1) continuous education of the public, starting now, in the lower grades of schools; (2) education of swine producers in livestock sanitation and disease prevention; (3) extension of laws requiring cooking (under supervision) of all garbage that is given to hogs, to embrace all States, and also the adoption of a rigid system of inspection to ensure the carrying out of such laws; (4) country-wide adoption of the valuable federal regulations for processing of pork commonly consumed without further cooking, so that processors not under federal inspection will be compelled to treat such pork in a way to make it safe; (5) passage of a law making the producer liable to punishment for shipment (into any stock-yard or slaughter plant) of hogs infected with *Trichinella*.

iv. This paper quotes data from the federal meat-inspection regulations regarding the refrigeration of pork and reviews the literature concerning quick freezing as a means of destruction of *Trichinella* larvae. It points out that though the latter has been proved effective in destroying the larvae, the method has not been fully investigated and is, therefore, not yet ready for general application. Moreover, the quick-freezing capacity of refrigerators in meat-packing plants is not sufficient to treat all the pork produced in the United States. Attention should also be paid to changes in the meat following this treatment, and consumer taste needs consideration. The value of prolonged freezing, according to the federal meat-inspection regulations, has been demonstrated, and the unsupervised storage of pork in food lockers and home freezers has also probably contributed to the control of the disease.

v. The recommendations drawn up by the 1952 conference are quoted in full, together with additional recommendations made at this meeting. They cover all aspects of the trichinosis problem including public health, animal health, legislation, proposals for research and for a committee to further the aims of the conference. These cannot be summarized.

T. H. Davey

Chan, K. F. & Brown, H. W. **Treatment of Experimental Trichinosis in Mice with Piperazine Hydrochloride.** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 746–9. [12 refs.]

The value of piperazine hydrochloride has been investigated for the treatment of the intestinal stage rather than the larval stage in muscle, of *Trichinella* infections in mice. White mice were used: they were free from helminth infection, 6 to 8 weeks old, and weighed 20 to 30 gm. They were

infected by means of a stomach tube with approximately 200 larval forms suspended in gum tragacanth. The drug was given from the 2nd or 6th day of the infection and continued for 7 days at the high dosage of 500 to 1,500 mgm./kgm. body weight. Other mice were infected by means of meat containing larval forms and treatment in that case lasted from the 9th to 15th day of infection.

Twenty-four hours after the end of treatment the animals were killed and the number of adult worms in the small intestine ascertained. Those free in the lumen were discarded, but others present in the intestine and freed by means of dilute caustic soda were counted with the aid of a dissecting microscope. There was reduction of up to 90 per cent. in the number of intestinal worms as a result of treatment, the reduction being greatest when treatment was started at the 9th day of infection. At the dosage mentioned toxicity from the drug was not apparent but at a dosage of 2,000 mgm. per kgm. diarrhoea occurred. Although some success was obtained in mice the doses of the drug were very large and the authors suggest that in man clinical trials might be made with piperazine citrate in a dosage of 2 to 3 gm. daily in trichinosis infections. *J. D. Fulton*

DEFICIENCY DISEASES

Colonial Office. **Malnutrition in African Mothers, Infants and Young Children.** Report of the Second Inter-African Conference on Nutrition held under the Auspices of the Commission for Technical Co-operation in Africa South of the Sahara (C.C.T.A.) at Fajara, Gambia, 19th–27th November, 1952 [Platt, B. S., President]. 398 pp., frontispiece, numerous figs. & 56 pls. 1954. London: H.M. Stationery Office. [25s.]

The Conference devoted a great deal of attention to kwashiorkor, its pathology and biochemistry and to other problems of malnutrition (clinical section 71 pages, pathology and biochemistry 115, dietetics 59, maternal malnutrition 29, treatment and prevention 34, terminology 12, recommendations and conclusions 3).

The 12 pages on terminology indicate that some workers continue to regard a nutritional disorder as something like measles or smallpox—a disease that one either has or has not. The majority of cases are in fact mild, mixed and marginal pictures, modified, precipitated or confused, not only by infections and infestations but by mental and emotional stress. It is these in cases where diagnosis is most important and may be difficult.

Some of the contributions to this volume are of very great interest. It is regrettable that so far little information is available with respect to epidemiology, and the social and cultural factors in the aetiology of the various forms of malnutrition. In fact microcosmic problems attract attention and research, while the macrocosmic are mainly neglected.

Dr. Hugh Trowell (p. 317) states that " It is in the infant welfare clinics that ideas will be clarified concerning methods designed to prevent kwashiorkor and to diagnose, differentiate and cure early cases ". Professor B. S. Platt in the Introduction states that " Experience of the application of knowledge about the prevention of malnutrition in rural African communities is . . . meagre ". It is to be hoped that this account of the Conference will emphasize the need for research into the basic aetiology

and epidemiology of malnutrition, and into the development of the type of maternal and child health work which will lead to its treatment and prevention. *Cicely D. Williams*

Passmore, R. **The Interpretation of the Clinical Stigmata of Nutritional Deficiency.** *Proc. Nutrition Soc.* 1954, v. 13, No. 2, 105–11. [14 refs.]

The author emphasizes the report of FAO/WHO Joint Expert Committee on Nutrition [this *Bulletin*, 1952, v. 49, 296] and the importance of using the 5 distinctive methods of assessment: (1) dietary surveys; (2) a study of vital statistics; (3) anthropometric measurements; (4) biochemical and physiological studies; (5) clinical surveys.

There is a useful list in which Group A—well defined nutritional disorders—are separated from Group B—conditions frequently associated with defective diet, and a salutary reminder that the " under fives " are the most vulnerable and most often neglected group.

The author emphasizes the importance of the non-dietary causes of malnutrition and the need for medical personnel to investigate and assess these factors, as the significance of signs may be misleading to those not medically qualified.

[The importance of these non-dietary factors in many areas makes it extraordinary that the author should challenge the Gillmans' remark that " there is a vast difference between the chemical analysis of a food and its biological usefulness " on the grounds that they have greatly overstated their case. Unless these non-dietary and non-economic factors are appreciated and assessed, all planning for nutritional improvement is a waste of time.] *Cicely D. Williams*

Watler, D. C. **A Case of Liver Cirrhosis in a Child.** *West Indian Med. J.* 1954, June, v. 3, No. 2, 98–103, 2 figs. on pl. [14 refs.]

" The clinical history and pathological findings are described in a case of hepatic cirrhosis dying at the age of 3½ years. The onset of symptoms began soon after the cessation of breast feeding with the development of ascites and hepatomegaly, later followed by jaundice and a haemorrhagic diathesis.

" At autopsy a well developed cirrhosis of the liver was present, the microscopic appearance of which revealed a thickening of the intima of the branches of the hepatic veins and a marked fibrosis showing a predilection for non-portal areas. It is suggested that this picture fits into the group described by Bras, Jelliffe and Stuart (1954), as chronic veno-occlusive disease or chronic V.O.D.

" Kwashiorkor and the infantile hepatic cirrhosis of the Indian workers are briefly compared with this condition."

Fuhrmann, G. Das Kwashiorkor-Syndrom. [**The Kwashiorkor Syndrome**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1954, July, v. 5, No. 3, 362–75, 1 fig. [28 refs.]

South Pacific Commission. Noumea, New Caledonia. **Bibliography of the Nutritional Aspects of the Coconut** [Peters, F. E.]. *Technical Paper No. 58.* 1954, Apr., mimeographed pp. v + 35, 1 map. [2s.]

HAEMATOLOGY

White, J. C. & Beaven, G. H. **A Review of the Varieties of Human Haemoglobin in Health and Disease.** *J. Clin. Path.* 1954, Aug., v. 7, No. 3, 175–200, 3 figs. [Numerous refs.]

Motulsky, A. G., Paul, M. H. & Durrum, E. L. **Paper Electrophoresis of Abnormal Hemoglobins and its Clinical Applications. A Simple Semiquantitative Method for the Study of the Hereditary Hemoglobinopathies.** *Blood.* 1954, Sept., v. 9, No. 9, 897–910, 7 figs. [25 refs.]

Schneider, Rose G. **Incidence of Hemoglobin C Trait in 505 Normal Negroes: a Family with Homozygous Hemoglobin C and Sickle-Cell Trait Union.** *J. Lab. & Clin. Med.* 1954, July, v. 44, No. 1, 133–44, 6 figs. [24 refs.]

Paper electrophoresis is a suitable method for a survey of large numbers of persons for the presence of abnormal haemoglobins. Five hundred and five Negro blood bank donors in Texas showed an incidence of 3·0 per cent. for the haemoglobin C trait and of 11·3 per cent. for the sickle-cell trait. One family with both haemoglobin C and haemoglobin S was particularly studied; one parent was a haemoglobin C homozygote. This woman with haemoglobin C in homozygous combination had no raised foetal haemoglobin but a shortened survival time of her red cells on transfusion into a normal recipient (about 30 days). It was of interest that whereas in the father who was a heterozygote for sickle and normal haemoglobin the percentage of S was 30, in one of the children who was a heterozygote for S and C, the percentage of S was 60, indicating that there may be a greater quantitative expression for the S gene when associated with C than with A.

H. Lehmann

Barnola, J., Tovar-Escobar, G. & Potenza, L. Enfermedad por células falciformes. [**Sicklaemia**] *Archivos Venezolanos Puericult. y Pediat.* 1953, July–Sept., v. 16, No. 49, 293–376, 32 figs. on 17 pls. [98 refs.]

This is a very detailed study of sicklaemia and the sickle-cell trait as met with in Venezuela. Long though it is, it goes into so much detail that no aspect of the subject is left unconsidered and no one coming fresh to the question and desirous of studying it as a whole could do better than read the article in its entirety.

After a brief section of introductory remarks on the limitation of the disease to the Negro races or descendants with a history of Negro blood in the past is the statement that though the numbers of pure Negroes have diminished by mixed marriages the numbers of carriers of the sickle-cell trait are no less. In fact, the authors go further, saying that they have no doubt that the incidence is greater among those whose race has not remained wholly negroid. In a later section they describe the various clinical forms which may lead to wrong diagnoses, *e.g.*, with signs resembling those of "acute abdomen" calling for (needless) surgical operation, acute articular rheumatism, infective arthritis, leg ulcers, congenital heart conditions or intestinal parasitosis. Succeeding sections treat in turn of the definition of sicklaemia, distinguishing the sickle-cell trait from sickle-cell disease and the history of the disease in Venezuela, the first case having been recorded by Herrick in 1910 (*Arch. Intern. Med.*, 1910, v. 6, 517) and

the second by Washburn in 1911. Next follows incidence and geographical distribution, with details regarding Venezuela itself. Tables record the findings among various groups: among 1,335 children, apparently healthy, between 6 months and 15 years of age, there were 9 positive among 425 " whites " (2·1 per cent.); 18 among 721 half-castes (2·3) and 15 among 189 Negroes (7·93). Among 536 children in hospital up to the age of 12 years, none was found positive of 81 white children, 16 of 390 half-castes (4 per cent.) and 7 of 65 Negroes (10·7). Altogether, of 3,410 children examined up to December 1951, there were 6 among 460 whites (1·5), 55 among 2,211 half-castes (2·4) and 47 among 739 Negroes (6·3). Among a total of 6,381 persons, adults and children, the positives among 1,248 whites numbered 19 (1·5 per cent.), among 3,970 half-castes 105 (2·6), among 1,163 Negroes 76 (6·5). Further records among white races are mentioned; Sydenstricker (*J. Amer. Med. Ass.*, 1924, v. 83, 12) in America found none among 2,000 persons examined; the present authors found, as stated above, 19 positive among 1,248 (1·5 per cent.), but " the possibility of a mixture with the black race could not be excluded " [abstracter's translation]; Dreyfuss and Benyesch found 7 positive among 105 Yemenite children in Israel and another 5 among their relatives [see this *Bulletin*, 1951, v. 48, 831]. Lastly, Choremis *et al.* among 6,000 in Petromagoula (Greece) discovered 15 children with anaemia, splenomegaly, joint pains and sickle cells and 5 more among the adjacent population [*ibid.*, 1952, v. 49, 175].

Next, as to age; 2 cases were described by Mulherin and Houseal in children 3 and 5 days after birth, whose mothers had the disease, and the present authors saw it in a child of 2½ months and in 2 others of 3 months old. Some authorities state that they find no difference as regards sex; others that females are affected in a proportion of 3 to 2 males.

The next section goes into clinical details of 23 cases in the authors' experience; diarrhoea, fever and pallor are common; adenopathy, hepatomegaly, retarded development, splenomegaly, cardiac murmurs, jaundice and joint pains are less common. Others suffer from painful abdominal crises, signs of obstruction and renal complications or cardiopathies and cerebral manifestations have been recorded. Hughes *et al.* (*J. Pediatrics.*, St. Louis, 1940, v. 17, 166) have reported on 31 cases in 16 of which there was drowsiness, stupor or coma, in 14 hemiplegia, in 9 aphasia; others had headache, rigidity of neck and convulsions. Chronic ulcers of the leg have also been recorded in association with sicklaemia.

Diagnosis depends on laboratory examinations—anaemia, direct examination of the blood, leucocytosis and reticulocytosis. The red corpuscle average is about 3 million per cmm., but one patient had only 800,500 and the haemoglobin proportionately reduced, erythroblasts were seen in 11 of the 23, leucocytosis was observed in 10; in 5 the number was over 15,000 per cmm., 2 had more than 30,000; the maximum was 61,000 in a patient " suspected of whooping-cough ". Nine were tested for fragility of the red cells and 7 showed an increased resistance to haemolysis.

On pathogeny there is little or nothing to say, because nothing is certain, but remarks are made on the post-mortem findings in the glands, the bone-marrow, the heart, liver, spleen and other organs. The deficiency of oxygen in the deformed corpuscles and consequent thrombosis in the different organs may partly explain the symptoms. The cause of death was also indeterminate and due at times to intercurrent disease.

Treatment is unsatisfactory, probably because the cause is unknown. Splenectomy may prove useful if this organ is much enlarged; repeated transfusions have been tried. *H. Harold Scott*

Gallais, P., Fourquet, R. & Alluis, J. Note sur la signification pathologique éventuelle de la sicklémie. [**Pathological Potentialities of Sickle-Cell Anaemia**] *Méd. Trop.* Marseilles. 1953, July–Aug., v. 13, No. 4, 511–13.

In an investigation of African soldiers in Marseilles a significantly higher percentage of sickle-cell-trait carriers was found in neuropsychiatric patients than in the normal serving soldiers or patients with general medical or surgical conditions. Of 375 neuropsychiatric patients 58 showed sickle cells (15·4 per cent.) whereas in 500 healthy soldiers, 50 surgical and 200 general medical patients, the percentages were, respectively, 5·4, 4 and 8. It was also of interest that in the serving soldiers the sickle-cell trait was found more rarely than it had been reported from the populations from which the soldiers had been recruited. Though the standards for recruitment are not very rigorous, they seem to eliminate a considerable number of sicklaemics.

H. Lehmann

Chernoff, A. I., Shapleigh, J. B. & Moore, C. V. **Therapy of Chronic Ulceration of the Legs associated with Sickle Cell Anemia.** *J. Amer. Med. Ass.* 1954, Aug. 21, v. 155, No. 17, 1487–91, 3 figs. [Refs. in footnotes.]

"Six patients with sickle cell anemia and the typical associated ulcers of the leg responded with rapid healing of the lesions when treated by bed rest, local therapy to the ulcers, and maintenance of red blood cell counts and hemoglobin levels at normal or near-normal levels. The time required for healing was considerably shorter than had previously been required for similar ulcers in each patient."

Humble, J. G., Anderson, I., White, J. C. & Freeman, T. **A Family illustrating the Double Inheritance of the Sickle Cell Trait and of Mediterranean Anaemia.** *J. Clin. Path.* 1954, Aug., v. 7, No. 3, 201–8, 8 figs. [25 refs.]

"A family exhibiting the double inheritance of the sickle-trait and Mediterranean anaemia is described.

"The family was discovered by the coincidental illness of one of its members.

"The presence of sickle-cell haemoglobin was demonstrated in the blood of the father, of the affected daughter, and of two of the sons by determining the solubility of the haemoglobin in the reduced state.

"Sickle-cell haemoglobin was also demonstrated in the blood of these four members of the family by the technique of paper electrophoresis, but not in the blood of the mother or of the third son.

"Attention is drawn to the additive effect of the two conditions in the production of clinical disease."

Nieweg, H. O., Faber, J. G., de Vries, J. A. & Stenfert Kroese, W. F. **The Relationship of Vitamin B_{12} and Folic Acid in Megaloblastic Anemias.** *J. Lab. & Clin. Med.* 1954, July, v. 44, No. 1, 118–32, 3 figs. [56 refs.]

Three groups of substances are involved in the formation of the nucleic acids which are necessary for normoblastic haemopoiesis: folic acid, vitamin B12, and constituents of nucleic acids such as uracil, thymine and

thymidine. Small amounts of these factors can be measured by microbiological methods. Folic acid stimulates the growth of *Streptococcus faecalis*, and vitamin B12 that of certain strains of *Lactobacillus leichmannii*. The authors found that in the tropical macrocytic anaemia of Wills and Evans [this *Bulletin*, 1938, v. 35, 846] the folic acid activity of the blood was reduced but that the vitamin B12 content of the serum was normal. In pernicious anaemia vitamin B12 was reduced and the folic acid activity was either normal or low. When it was normal vitamin B12 injection led to a fall of folic acid activity. The authors conclude that vitamin B12 influences either uptake or storage of folic acid. The rôle of these factors in nucleic acid formation is discussed in detail. Vitamin B12 is necessary for the formation of uracil, uracil is necessary for the formation of both ribose nucleic acid (RNA) and desoxyribose nucleic acid (DNA). Folic acid is not necessary for the formation of RNA, but for that of DNA from uracil. RNA deficiency causes damage to the nervous system such as neuritis and subacute degeneration of the spinal cord, DNA deficiency is responsible for glossitis and megaloblastic anaemia. It is thus clear why in cases of folic acid deficiency vitamin B12 will not be able to cure the megaloblastic anaemia. In vitamin B12 deficiency folic acid will divert the limited supply of uracil to the formation of DNA and exacerbate the RNA deficiency with subsequent damage to the nervous system. *H. Lehmann*

VENOMS AND ANTIVENENES

Janzsky, B. & Helle, J. **Decreased Clotting Time of Rabbit Blood induced by Snake Venom Injection.** *Mem. Inst. Butantan.* 1953, v. 25, No. 1, 1–4. [11 refs.]

"Snake venom (*Bothrops atrox*) injected intravenously in rabbit in doses between 12 and 240 μg/k produced a shortening of the clotting time measured in siliconized tubes. The mechanism of such action remains a matter of investigation."

Fischer, F. G. & Dörfel, H. Die Aminosäuren-Zusammensetzung von Crotoxin. [**The Amino-Acid Content of Crotoxin**] (Schlangengifte IV.) *Hoppe-Seyler's Ztschr. physiol. Chem.* 1954, v. 297, Nos. 3/6, 278–82.

Lee, Ya-pin. **The Mechanism of the Effect of Snake Venoms on Diphosphopyridine Nucleotide-Linked Lactic Dehydrogenase and Alcohol Dehydrogenase.** *J. Formosan Med. Ass.* 1954, May, v. 53, No. 5, 283–96, 7 figs. [21 refs.]

Silberberg, F. G. **Tiger-Snake Venom: Attempted Resuscitation in Rabbits.** *Med. J. Australia.* 1954, July 24, v. 2, No. 4, 139–41, 1 fig. [12 refs.]

"1. The previously described curariform action of the venom of the tiger-snake is confirmed.

"2. Experiments are described in which the life of rabbits given injections of venom was prolonged for several hours by tracheotomy and artificial

respiration. Death always ensued, however, because of inability to control the associated cardio-toxic effects of the venom.

"3. It is suggested that, in human cases of severe tiger-snake bite, tracheotomy and artificial respiration should not be omitted. They alone will probably not avert a fatal issue, but they may well prolong life until effective treatment with antivenene can be initiated."

[See this *Bulletin*, 1951, v. 48, 580.]

Bücherl, W. Quilópodos, aranhas e escorpiões enviados ao Instituto Butantan para determinação. [**Chilopods, Spiders and Scorpions sent to the Butantan Institute for Identification**] *Mem. Inst. Butantan.* 1953, v. 25, No. 1, 109–51, 22 figs. English summary.

Bücherl, W. Escorpiões e escorpionismo no Brasil. 1. Manutencão dos escorpiões em viveiros e extração do veneno. [**Scorpions and Scorpionism in Brazil. (1) Maintenance of Scorpions in Captivity and Extraction of Venom.**] *Mem. Inst. Butantan.* 1953, v. 25, No. 1, 53–82, 10 figs. English summary. 2. Atividade das peçonhas de *Tityus serrulatus* e *T. bahiensis* sôbre camundongos. [**(2) Action of the Venom of** *Tityus serrulatus* **and** *T. bahiensis* **on Mice**] *Ibid.*, 83–108, 8 figs. English summary.

Bücherl, W. Novo processo de obtenção de veneno sêco, puro de *Phoneutria nigriventer* (Keyserling, 1891) e titulação da LD_{50} em Camundongos. [**New Method of obtaining Pure Dried Venene from** *Phoneutria nigriventer* **and Titration of LD50 in Mice**] *Mem. Inst. Butantan.* 1953, v. 25, No. 1, 153–74, 9 figs. English summary.

Lebez, D. Beiträge zum Studium des Giftes von *Latrodectus tredecimguttatus* Rossi. [**Studies on the Venom of** *Latrodectus tredecimguttatus*] *Hoppe-Seyler's Ztschr. physiol. Chem.* 1954, v. 298, Nos. 1/2, 73–6.

Kaiser, E. **The Enzymatic Activity of Spider Venom. On the Influence of Sulfonated Polysaccharides on the Proteolytic and Hyaluronic Acid Splitting Activity of Spider Venom.** *Mem. Inst. Butantan.* 1953, v. 25, No. 1, 35–9. [25 refs.]

"There is no influence of sulfonated polysaccharides (heparin, sulfonated pectic acid) on the proteolytic activity of spider venom. The enzyme from spider venom splitting hyaluronic acid (arachnomucinase) is inhibited by heparin and sulfonated hyaluronic acid up to very small concentrations.

"There seems to exist, at least in this respect, no difference between the proteolytic enzyme of spider venom and crystalline trypsin on the one hand and between testicular hyaluronidase and the arachnomucinase detected in spider venom."

Schenone, H. Latrodectismo y Neostigmina. [**Latrodectism and Neostigmine**] *Bol. Chileno de Parasit.* 1954, Jan.–Mar., v. 9, No. 1, 27–8, 1 fig.

The English summary appended to the paper is as follows:—

"One case of spider-bite by *Lactrodectus mactans*, successfully treated with Neostigmine, is reported. The patient, a 21 year old male was bitten

in the right arm and marked generalized pain developed shortly thereafter, accompanied by typical muscular, secretory and nervous symptoms. It is worth to note that the patient had abdominal muscular contraction, a symptom that sometimes may cause diagnostic difficulties. All symptoms were very rapidly controlled by intramuscular injections of Neostigmine in 4 doses of 2 c.c. of 1:4000 solution (one every 8 hours). The probable mechanism of action is discussed. It is to be noted that this is one of a series of cases successfully treated with Neostigmine by the author."

TOXOPLASMOSIS

Parmentier, R., Vokaer, R. & Piraux, P. Un cas de toxoplasmose congénitale. [**A Case of Congenital Toxoplasmosis**] *Bruxelles-Méd.* 1954, July 25, v. 34, No. 30, 1427–35, 4 figs.

The second parasitologically confirmed case in Belgium.

Kozar, Z. **Value of the Toxoplasmin Test and of Allergometry.** *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1953, v. 5, 125–33. [Also in Polish 110–17. (12 refs.) & in Russian 117–25.]

The intradermal toxoplasmin test was carried out on 1,831 persons with a 1 in 500 dilution of an antigen prepared from the peritoneal exudate of mice infected with the RH strain of toxoplasma, and control inoculations were made with an antigen prepared from normal mouse spleen. The reactions were measured after 24 and 48 hours. The usually accepted minimum diameter of 10 mm. at 24 hours was found to be inadequate as a criterion for evaluating the results, and reactions which had fallen below this diameter after 48 hours were considered to be unspecific. In 1,652 persons tested in this way negative results were obtained in 699 instances; in 54 persons the diameter of the reaction varied between 9 and 11 mm. and the result was considered to be doubtful. Parallel examinations of sera from 65 persons by toxoplasmin and complement-fixation tests agreed in 60 instances (33 positive, 27 negative), and the result of toxoplasmic and dye tests agreed in 29 of 30 instances (18 positive, 11 negative). Some investigations of immunity in toxoplasmosis were made by the method of allergometry. *D. J. Bauer*

Kozar, Z. **Studies on Toxoplasmosis among the Mentally Sick.** *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1953, v. 5, 142–5. [Also in Polish 134–7 & in Russian 138–41.]

The Frenkel intradermal test for toxoplasmosis was carried out as described in the preceding paper on 961 patients in a hospital for nervous and mental diseases in the Danzig district and also on a control group of 681 healthy subjects living in the same area. In the control group positive reactions were obtained in 170 persons (25 per cent.), doubtful reactions in 18 (2·8 per cent.), and negative results in 493 (72·3 per cent.). In the group of hospital patients positive reactions were obtained in 495 (51·5 per

cent.), doubtful reactions in 39 and negative results in 427 patients. There was no correlation between the incidence of *Toxoplasma* infection and the type of mental or nervous disease. *D. J. Bauer*

Kozar, Z., Dłużewski, L., Dłużewska, Anna & Jaroszewski, Z. **Toxoplasmosis and Oligophrenia.** *Bull. State Inst. Marine & Trop. Med., Gdańsk., Poland.* 1953, v. 5, 183–92. [Also in Polish 164–73 & in Russian 173–83].

Thirty-eight mental defectives aged between 8 and 50 years were examined for signs of toxoplasmosis by skin tests, serological investigations, radiography of the skull and other appropriate measures. The results are shown in a table. A positive result by the dye test (a titre of 25 or higher) was obtained in 15 patients. *D. J. Bauer*

DERMATOLOGY AND FUNGUS DISEASES

Katzenellenbogen, I. [**Caterpillar Dermatitis as an Occupational Disease**] *Harefuah.* Jerusalem. 1954, July 1, v. 47, No. 1 [in Hebrew 1–3, 3 figs. English summary 3–4].

The English summary appended to the paper is as follows:—

" Every year, between the months of February and May, caterpillar dermatitis recurs in Jerusalem and the Judean Hills. It is caused by hairs of Thaumetopoea pinivora Wilkinsoni. The nests of Thaumetopoea pinivora appear regularly in January or February in the Pinus halepensis and Pinus canarensis. The increased afforestation in the above mentioned region, together with lack of rain has caused a great spread of the nests of Thaumetopoea pinivora and a consequent increase in the incidence of caterpillar dermatitis.

" A detailed description of caterpillar dermatitis and the rôle played by particular hairs is given.

" Between March and May 1953, 38 patients were treated by the author. Among them were 25 relief workers who had been sent to fight the caterpillar infestation. The actual removal of the nests (by hand) from the trees was very rapidly followed by a skin irritation affecting face, neck, arms, thorax and back. In ten cases the skin disorder was combined with a mild conjunctivitis. Macules, papules and in three cases vesicles covered the skin. Patients were disabled for a period lasting from two to eight days. Hence, after one day's work, many days of compensation had to be paid.

" A change in the method of removal of caterpillar nests became imperative and as a result spraying of the affected trees with cryocide-cryoline and gamecide was initiated.

" In 1954 only two cases of caterpillar dermatitis were found among forest workers. Those affected had, after spraying, removed the nests and carried them away to be burned.

" Tests demonstrated the danger of dead caterpillar hairs in provoking caterpillar dermatitis. Caterpillars were put into a closed tin box, which was opened three months later. The majority of the caterpillars had changed to cocoons; the rest were dead. Juice taken from the cocoon provoked no skin irritation, but a few hairs taken out of the leg of a dead caterpillar and placed for a few hours on the skin caused a localized necrotic

inflammation at the side. Histological examination showed an acute inflammation with a blister in the epidermis. No hairs were found in the epidermis."

Fonzari, M. Estado atual da terapêutica do pênfigo foliáceo pelo BCG. [**Present Position of the Treatment of Pemphigus Foliaceus by BCG**] *Arquivos de Dermat. e Sifiligrafia de São Paulo.* 1953, Jan.–June, v. 15, Nos. 1/2, 18–24, 2 figs. on pl. English summary.

In 1952 the author published a preliminary note on the use of BCG in pemphigus foliaceus [this *Bulletin*, 1953, v. 50, 758]. He has now tried the treatment in 29 patients, 12 in the pemphigus frustus stage, 3 foliaceus in the erythrodermic stage, 1 in the invasion stage of transition from the frustus to the foliaceus, and 13 remitting after treatment with quinacrine [mepacrine] bichloride. The results are detailed in the text and summarized in a table. The amounts of BCG given varies; the best results were obtained in the case of a white woman of 26 years who had had the disease for 13½ years and had been in hospital for 3 years and 3 months. She received 3·2 gm. in 4 months. Another woman of 21 years, who had had the disease for 3 years and had been in hospital for 11 months, received 11·2 gm. in 13 months and achieved equally good results, *viz.* disappearance of all the evolutive lesions. The same results obtained in one of the first group (pemphigus frustus) after receiving 13 gm. in 17 months. The treatment failed in 3 of this group, in all 3 of those in the erythrodermic phase and in 1 of the 13 in group 4. The rest benefited in varying degrees from lessening of the erythema and exfoliation, disappearance of some of the lesions and reduction in the area of others to disappearance of all but a few macules and 1 or 2 residual exfoliating places. In other words, 22 of the 29 showed some benefit. Those in the frustus or the remission stages responded best. *H. Harold Scott*

Puckett, T. F. **Hyphae of *Coccidioides immitis* in Tissues of the Human Host.** *Amer. Rev. Tuberculosis.* 1954, Aug., v. 70, No. 2, 320–27, 6 figs. [16 refs.]

A hyphal or mycelial form of *Coccidioides immitis* in the lesions of human coccidioidomycosis has been reported on a few occasions but was considered to be very rare; Forbus and Bestebreurtje [this *Bulletin*, 1948, v. 45, 269] found only one example of it in a pathological analysis of 95 cases of coccidioidomycosis.

The present author has made a study of morbid tissues from 64 cases of coccidioidomycosis with chronic, focalized and stabilized pulmonary disease. The fresh material, obtained by surgical operation, was fixed for sectioning within 2 to 3 hours of the operation, so there was no possibility of the mycelial form developing in the tissue after removal from the patient. Thirty-four of the specimens showed cavitation and the remaining 30 consisted of solid granulomatous lesions, with or without satellite nodules. As haematoxylin was not satisfactory for staining the hyphae, the periodic-acid-Schiff technique [*Bulletin of Hygiene*, 1951, v. 26, 825; 1952, v. 27, 95] was used. When the hyphal form was not found at a routine examination, serial sections of the tissue were prepared and studied.

Mycelial structures were found in 25 (73 per cent.) of the 34 specimens with cavitation and in 9 (30 per cent.) of the 30 solid lesions. These mycelial structures consisted of simple, branching, septate hyphae, found

chiefly in the solid lesions, tangled mycelial masses, usually in the walls of cavities, and collections of hyphae associated with spherical bodies presumed to be endospores liberated from the parasitic sporangia. The last form may have represented an abortive germination of endospores, but it is possible that some of the round bodies were merely cross-sections of mycelial tubes. Fragmented spherules and apparent, free endospores were sometimes associated with hyphae, particularly in the solid lesions, but where typical spherules were found, hyphae were usually absent. Conversely, where the spherules were absent from a cavity, hyphae were often found, although the spherules were frequently present in the surrounding lung tissue.

A mass of mycelium spreading outwards in fan-shape, like one of the pathogenic moulds, showed, in its advancing margin, prominent thick-walled cells or segments which the author compares to the "culture sporangia" described by Baker and Mrak (*Amer. J. Trop. Med.*, 1941, v. 21, 589). These structures, however, seem to be merely sterile, bloated, hyphal segments. The possibility that some of these mycelial growths represented contaminant moulds vegetating in the cavities was excluded by the uniform character of the mycelium found in all the specimens and the fact that cultures always yielded pure growths of *C. immitis*.

It is noteworthy that the tissues in which the hyphal forms were found were from chronic, focalized and stabilized lesions. It was considered that a disturbance of the host/parasite relationship might account for the morphological change in the fungus, but, in this connexion, no demonstrable correlation was found between the occurrence of the hyphal form in the lesion and the absence of allergic sensitivity to *C. immitis*.

There is no reason to assume that the possibility of transmission of the infection directly from man to man is increased by the presence of the mycelial form in pulmonary lesions. *J. T. Duncan*

Forsee, J. H. & Perkins, R. B. **Focalized Pulmonary Coccidioidomycosis. A Surgical Disease.** *J. Amer. Med. Ass.* 1954, July 31, v. 155, No. 14, 1223–7, 7 figs. [Refs. in footnotes.]

The authors describe the surgical treatment of 50 cases of chronic focalized pulmonary coccidioidomycosis. Forty-seven of the patients were males and 3 females; the oldest was aged 45, the youngest 18 and the average age was 29.

Only 18 of the patients had experienced symptoms in the acute stage of the disease, but 35 had symptoms in the chronic stage; these were cough (31), pain in the chest (10), haemoptysis (9), loss of weight (9), fatigue (7), expectoration (7), fever (5), weakness (5) and dyspnoea (3). None felt seriously ill.

X-ray examination of the chest showed a round and apparently solid lesion of the lung in 17; radiography did not usually reveal the disease in the surrounding lung tissue. In 3 cases, an appearance of apical infiltration was found on pathological examination to consist of a less well-defined solid lesion with surrounding inflammatory reaction and associated satellite nodules. Cavitation was present in 30 cases, the cavity being typically thin-walled, cyst-like and discrete, without visible infiltration of the surrounding lung tissue. Some cavities, however, were irregular and ragged in outline and of considerable size. Because of the radiological resemblance to pulmonary tuberculosis, 25 of the patients had been treated for that disease for an average of 7 months each.

The true nature of the solid lesion could not be established before operation, and, in view of the possibility of neoplasm, it is not advisable to wait and watch progress. Positive diagnostic data were obtained by bronchoscopy in 5 instances, by sputum smears in 9, by sputum culture in 14 and by the dermal sensitivity test in 31.

In all 50 cases, " primary definite resectional surgery " was employed. This consisted of wedge resection for 19 solid lesions and 6 cavities, lobectomy for 1 solid lesion and 19 cavities, segmental resection for 3 cavities and lobectomy with segmental resection for 2 cavities. The decision on the extent of the operative procedure to be employed should be made at the time of exploration. In this series there were no operative or post-operative deaths.

Of 44 of the patients followed up for an average period of 31 months after operation, 37 were asymptomatic and fully employed, 5 still had symptoms but were partly or fully employed, 1 was incapacitated because of cough and chest pain and 1 was still under hospital treatment; the 6 other patients were not followed up.

Recurrent cavitation, reported by other observers, appears to be a consequence of insufficiently extensive resection. Collapse therapy and artificial pneumothorax have not been successful in the treatment of coccidioidal cavitation.

The solid lesions, in the present series, were usually discrete, round and firm and measured up to 3 cm. in diameter. They were found chiefly in the upper lobes and immediately under the pleura, and satellite nodules were frequently present. Multiple, large solid lesions were not encountered, but a solid lesion and a cavity were sometimes associated in the same patient. The cavities occurred chiefly in the upper lobes and were usually from 2 to 4 cm. in diameter, but occasionally much larger. They were almost invariably superficial and were sometimes covered only by the visceral pleura. In some cases bronchial communication with the cavity was demonstrable.

C. immitis was most easily identified in the tissue sections, and in 15 cases the mycelial form described by Puckett [above, p. 1293] was seen in cavities. Diagnosis by smear and by culture was less successful.

J. T. Duncan

Sutliff, W. D., Kyle, J. W. & Hobson, J. L. **North American Blastomycosis: Clinical Forms of the Disease and Treatment with Stilbamidine and 2-Hydroxystilbamidine.** *Ann. Intern. Med.* 1954, July, v. 41, No. 1, 89–107, 10 figs. [10 refs.]

The therapeutic value of stilbamidine in North American blastomycosis has been discussed in several earlier reports [see this *Bulletin*, 1953, v. 50, 758, 1074; 1954, v. 51, 982; and the *Bulletin of Hygiene*, 1952, v. 27, 1112; 1953, v. 28, 821; 1954, v. 29, 366, 735].

In the present report, the authors compare the results of the older forms of therapy with those obtained by treatment with the aromatic diamidines, stilbamidine and 2-hydroxystilbamidine. However, greater diagnostic acumen and better technical methods have enabled the inclusion, for the later studies, of some earlier stages and milder forms of the disease, particularly suitable for therapeutic tests. Some of these were cases with cutaneous lesions only, cases with a few lesions confined to one anatomical system, and cases with a single pulmonary lesion which tends to heal spontaneously but may give rise to reinfection foci in other parts.

Of the 11 cases treated by the older methods, 3 were given intensive

iodide therapy and in 2 of these the disease was arrested; the third, a cutaneous case, was not improved. Three cases were cured by surgical measures including lobectomy and excision of superficial lesions, and of the remaining 5, which received " various " treatments 2 died and 3 were unimproved.

Seven cases were treated with stilbamidine and the disease was arrested in 6 of these, including 2 in which the older methods of treatment had failed; the seventh case proved refractory to treatment. One of the " arrested " cases relapsed after 19 months, but 4 others, under observation for from 10 to 20 months, remained well. In the 6 arrested cases the total dosage of the drug given ranged from 1·65 gm. to 5·75 gm., and in the resistant case, with pulmonary, laryngeal and cutaneous lesions, 8·2 gm. Trigeminal neuritis was a toxic complication in 5 of the cases and nephritis in another.

Twelve patients were treated with 2-hydroxystilbamidine and 9 showed prompt improvement. In 7 of the 9 the disease was arrested, but one of these patients was also treated with stilbamidine. In 2 cases improvement occurred but pulmonary lesions persisted; these might have been suitable subjects for lobectomy. The remaining 3 patients showed no improvement. One of the arrested cases, with cutaneous disease of 84 months' duration, had received only 4·5 gm. of the drug, and 3 of the patients remained well over periods of observation of from 15 to 24 months.

The improvement and arrest of the disease under stilbamidine or 2-hydroxystilbamidine treatment was prompt and contrasted with the very slow response to the older forms of drug treatment, when these were successful.

The dosage of stilbamidine used was 150 mgm. dissolved in 500 ml. of 5 per cent. glucose solution, given daily for 10 days by slow intravenous injection. Second and third courses were given with rest intervals of 1 or 2 weeks. In solution, the toxicity of stilbamidine increases rapidly when it is exposed to light; therefore the solution should be prepared immediately before use and protection afforded from daylight. Because the drug accumulates in the tissues, the patient must also be protected from exposure to strong daylight during and for about 2 weeks after treatment.

2-hydroxystilbamidine was administered in the same way as stilbamidine but the dosage was 225 mgm. in 500 ml. glucose solution daily for 30 days, with a second course if necessary. Although the drug is comparatively non-toxic and is much less affected by light than stilbamidine, the precautions mentioned above should be observed with 2-hydroxystilbamidine also.

J. T. Duncan

Gordon, L. E., Smith, C. E., Tompkins, Marianne & Saito, Margaret T. **Sensitivity of *Coccidioides immitis* to 2-Hydroxystilbamidine and the Failure of the Drug in the Treatment of Experimental Coccidioidomycosis.** *J. Lab. & Clin. Med.* 1954, June, v. 43, No. 6, 942–5, 1 fig.

In view of the successful treatment of North American blastomycosis with stilbamidine and with 2-hydroxystilbamidine [see Sutliff *et al.*, above], Snapper (unpublished) employed 2-hydroxystilbamidine in the treatment of cases of coccidioidomycosis but he obtained only inconclusive results.

In the present report, the authors describe tests of the fungistatic power of 2-hydroxystilbamidine on *Coccidioides immitis in vitro* and of its therapeutic value in experimental coccidioidomycosis in mice.

For the *in vitro* tests, a chemically defined broth medium containing asparagin was used, and 2-hydroxystilbamidine was tested at concentrations of 100 μgm., 10 μgm., 1 μgm., 0·1 μgm., and 0·01 μgm. per ml. respectively

in this medium. A sowing of approximately 500 spores of *C. immitis* was made into each tube and the test was incubated at 37°C. for 21 days, readings of growth being taken at intervals. The results showed total inhibition of growth at 100 μgm. per ml., very slight growth which developed only after 16 days at 10 μgm. and slightly delayed growth at 1 μgm. When arginine hydrochloride, which is inhibitory to 2-hydroxystilbamidine, was added to the medium to a concentration of 5 per cent., complete fungistasis still occurred at 100 μgm., but marked interference with the action of the drug was observed at 10 μgm. and all lesser concentrations of 2-hydroxystilbamidine.

For the tests *in vivo*, mice were inoculated intraperitoneally with a dose of approximately 150 *C. immitis* spores. The 2-hydroxystilbamidine was prepared for subcutaneous injection by dissolving the crystalline preparation in 6 per cent. gum acacia, so that 0·5 ml. of the suspension contained 0·5 mgm. of the drug; 0·5 mgm. was the maximum dosage which could be tolerated over a period of time. The first subcutaneous injection of 0·5 mgm. was made immediately after the infecting inoculation with *C. immitis*, and the injections were repeated daily for 10 days, and thereafter on alternate days. All the animals died of the infection.

Failure of the drug in the treatment of experimental coccidioidomycosis does not necessarily indicate its therapeutic uselessness, as a similar failure was recorded with experimental blastomycosis in mice although the drug had proved effective in the treatment of human blastomycosis. However, the fungistatic tests *in vitro* against *C. immitis* suggest that the effective dosage would be too high for therapeutic use. Nevertheless, it is recommended that a further study of this form of drug therapy should be made on cases of progressive coccidioidomycosis. *J. T. Duncan*

Furtado, T. A., Wilson, J. W. & Plunkett, O. A. **South American Blastomycosis or Paracoccidioidomycosis. The Mycosis of Lutz, Splendore, and Almeida.** *Arch. Dermat. & Syph.* 1954, Aug., v. 70, No. 2, 166–80, 7 figs. [84 refs.]

A general review.

TROPICAL OPHTHALMOLOGY

Foley, H. & Parrot, L. Le trachome des nourrissons dans les oasis sahariennes. [**Trachoma in Infants in the Sahara Oases**] *Arch. Inst. Pasteur d'Algérie.* 1954, June, v. 32, No. 2, 87–91. [15 refs.]

The authors state that in most of the oases of the Algerian Sahara, trachoma at the present time attacks the great majority of infants before the end of their first year of life. The disease does not generally appear before the end of the third month, which seems to exclude the hypothesis of transmission of the virus from the mother during labour. The development of the infection comprises, before the palpebral lesions arise, a pure epithelial phase during which the virus is particularly vulnerable. It is during this phase that the infection is local and has not taken deep root, and prophylactic and therapeutic measures stand a good chance of success. *D. P. Choyce*

Poleff, L. Procédé de numération et d'enregistrement des corps du trachome. L'intérêt du placenta comme test de guérison du trachome. [**Method of counting and recording Trachoma Bodies. Trial of Placental Extract as a Test of Cure**] *Maroc Méd.* 1953, Dec., v. 32, No. 343, 1339–42, 2 charts. [32 refs.]

This paper concerns a method of counting trachoma bodies per 100 or 1,000 cells examined.

The purpose of this procedure is to standardize the virulence of trachomatous material. Cortisone and placental extract were tested for the cure of trachoma, and the effect of penicillin on the activity of secondary infection of trachoma is also demonstrated. Both cortisone and placental extract are liable to cause reactivation of trachoma which has been clinically cured. This reaction, however, cannot be considered purely as being of the nature of a reaction to foreign protein.

[The criticism can be made of this paper that inclusion bodies are not necessarily due to infection with the trachoma virus.] *D. P. Choyce*

Toulant, P. F. & Boithias, R. Les lésions oculaires de l'onchocercose africaine. [**Ocular Lesions in African Onchocerciasis**] *Méd. Trop.* Marseilles. 1954, Mar.–Apr., v. 14, No. 2, 191–9.

This paper makes very interesting reading.

The first part is devoted to a careful survey of the clinical manifestations of ocular onchocerciasis. The authors' description of the anterior segment lesions, such as punctate keratitis, iridocyclitis, false hypopyon and the incidence of secondary glaucoma and cataract, is sound. They make a claim with which not all authorities would agree, namely that the limbal changes are characteristically pigmented, whether the patient be coloured or European. Their descriptions of the posterior segment lesions (chorioretinitis and optic atrophy) are equally sound.

They go on to discuss the diagnosis of onchocerciasis, in which they point out that it is often easier to recognize the microfilariae in the anterior chamber of the eye, than by examination of skin scrapings. In a suspect case of ocular involvement, conjunctival snips very often demonstrate the microfilariae. Treatment: (a) by extirpation of the nodules; (b) by chemotherapy, the drugs used being Notézine [diethylcarbamazine] and Moranyl; and exacerbation of the ocular signs under treatment furnishes further proof of the diagnosis.

In discussing the pathogenesis of the disease they draw attention to the fact that patients may have no ocular symptoms, yet examination demonstrates numerous microfilariae in the anterior chamber and in the conjunctiva. Some patients may continue without symptoms for many months; then symptoms suddenly occur and the condition of the eyes deteriorates.

They conclude that in such cases a host-parasite balance is set up which is subsequently disturbed by some outside agent. *D. P. Choyce*

Boithias, R. Incidence médico-militaire de l'onchocercose. [**Incidence of Onchocerciasis in Military Medical Practice**] *Méd. Trop.* Marseilles. 1954, Mar.–Apr., v. 14, No. 2, 200–203.

This paper cites 6 cases of onchocerciasis of varying grades of severity encountered in African soldiers during routine eye examination.

Attention is drawn to the fact that this condition may be frequent and serious among Africans who come from infested regions and that they may begin to suffer from the disease when transferred to the European metropolis. *D. P. Choyce*

MISCELLANEOUS DISEASES

Ghoshal, R. **Lathyrism.** *Calcutta Med. J.* 1954, June, v. 51, No. 6, 191–204. [67 refs.]

A general review and discussion.

Vasquez, L. E., Mancia, B. & Bloch, M. Eosinofilia tropical. Reporte de dos casos. [**Two Cases of Tropical Eosinophilia**] *Archivos Colegio Med. de El Salvador.* 1953, Mar., v. 6, No. 1, 66–8.

The first two cases reported in San Salvador.

Días-Rivera, R. S., Ramos-Morales, F. & Cintrón-Rivera, A. A. **Infiltrative Eosinophilia.** *Arch. Intern. Med.* 1954, July, v. 94, No. 1, Sect. 1, 102–21, 6 figs. [100 refs.]

A general review and discussion with report of a case.

Sen, S. K. & Tribedi, B. P. **Experimental Studies in Tropical Eosinophilia.** (A Preliminary Report.) *J. Indian Med. Ass.* 1954, July, v. 23, No. 10, 432–6, 3 figs. on 2 pls. & 1 graph. [13 refs.]

Plasma from 8 patients suffering from tropical eosinophilia was injected intraperitoneally into 8 healthy guineapigs with a normal eosinophile count. An initial rise in the eosinophile count lasting 2 or 3 weeks was followed by a fall and then a prolonged and progressive rise developing from 1–5 months after the injection. A control group of 4 guineapigs injected intraperitoneally with normal plasma showed the initial transient rise but no further increase in eosinophiles. A third group of 4 guineapigs kept under observation and not injected showed a fairly constant eosinophile count during the period of observation.

Necropsy studies on the first group showed broncho-pneumonic patches in the lungs with bronchiolitis and parabronchiolar and paravascular infiltration of lymphocytes and eosinophiles. No macroscopic or microscopic changes were found in the lungs of the control groups. *H. T. H. Wilson*

Gelfand, M. **Onyalai: a Clinical Study.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1954, July, v. 48, No. 4, 353–9, 1 fig. [19 refs.]

Onyalai is a condition easy of recognition. It starts more or less suddenly with bleeding from the mouth and perhaps other sites. Blood may be observed in the urine or in the stools; in women the periods may be profuse. When bleeding becomes severe the patient is exsanguinated.

Characteristic of onyalai are the black blisters in the oral cavity and on the skin. The disease rarely recurs. Onyalai is distinguished by the peculiar geographical distribution. It seems to be most frequent in males and only rarely occurs in non-Africans. It is not a deficiency disease, nor has it been proved to be due primarily to poisonous native remedies [this *Bulletin*, 1944, v. 41, 1067]. Popular and medical opinion in Africa favours intramuscular injections of whole blood as a remedy. Vitamin K does not seem to be effective as a permanent cure.

The author agrees with Blackie [*ibid.*, 1938, v. 35, 74] that onyalai is probably a form of thrombocytopenia. Bleeding time is usually prolonged, while clotting time is normal. Onyalai rarely leads to death and the great majority of subjects recover fairly rapidly.

The author gives details of 45 cases in Africans seen in Southern Rhodesia. The literature is discussed at some length. This is a very useful account of present knowledge of onyalai. *Philip Manson-Bahr*

Alcerro, J. N., Corrales Padilla, H. & Adán Cueva, J. Escleroma rino-faringo-laringeo en Honduras. [**Rhino-Pharyngo-Laryngeal Scleroma in Honduras**] *Archivos Colegio Med. de El Salvador.* 1953, Sept., v. 6, No. 3, 326–33, 9 figs.

The authors state that these cases of rhinoscleroma are fairly common in Honduras, in the central, northern and southern zones, but most in the districts bordering on El Salvador. The present article deals particularly with 9 patients, 7 females and 2 males, their ages ranging between 15 and 45 years. Only one of the 9 was married; of the other 8 unmarried, 6 lived in concubinage (*maritalmente*), but none seemed to have acquired the disease by contact. The time which had elapsed since the first symptoms appeared, before the patients presented themselves for treatment, was from 6 months to 16 years, and the earliest symptoms were a bulging and stuffiness of the nostrils. Diagnosis was made by histological examination and the finding of Mikulicz's cells, in which there were seen vacuoles and an amorphous material, faintly eosinophilic, and small unstained rods thought to be von Frisch's bacillus (*Klebsiella* [*Bact.*] *rhinoscleromatis*) together with Russell's corpuscles.

Treatment has consisted of injections of Repodral (containing 13·6 per cent. of antimony) starting with 0·5 cc. (1 cc. contains 8·1 mgm. of trivalent antimony) daily for 3 consecutive days to test the patient's reaction to the drug, followed by injection of 4 cc. every 5 days. As much as 120 cc. might be injected hypodermically before any sign of intolerance appeared. Radiotherapy was also employed and surgical measures (electrocautery) in the case of 1 patient in whom fibrous bands were binding the base of the tongue to the posterior wall of the pharynx. The disease is found mostly among the poorer classes. *H. Harold Scott*

Chambon, L. & de Lajudie, P. Contribution à l'étude du métabolisme du bacille de Whitmore. [**Contribution to the Study of the Metabolism of Whitmore's Bacillus**] *Ann. Inst. Pasteur.* 1954, June, v. 86, No. 6, 759–64.

The authors investigated the ability of 25 strains of Whitmore's bacillus —23 from human cases of melioidosis and 2 from animal sources—to grow in a basic synthetic medium, usually that of Lwoff which contains no C or

N, when various sources of these two elements were added. Growth was supported by the addition of almost any of the amino acids tested. No indole was produced from tryptophan, and no H_2S from cysteine. Growth was obtained in the synthetic medium containing urea only if a sugar such as glucose was also present. With ammonium sulphate as source of N, all the strains could utilize the carbon necessary for growth from sodium acetate or sodium citrate, but not from carbonates, oxalates, ethyl or methyl alcohol.

The conclusion is that Whitmore's bacillus is not very exacting and could be classified as one of Lwoff's mesotrophic bacteria. It might be expected to occur widely in nature, though there is no record of its isolation from sources other than pathological material. *J. C. Cruickshank*

Miletto, G. Le cancer du foie en milieu tropical. [**Cancer of the Liver in the Tropics**] *Méd. Trop.* Marseilles. 1954, May–June, v. 14, No. 3, 302–17. [38 refs.]

L'Hoiry, J. Première étude sur le problème du cancer en Océanie Française—Iles du Vent—Iles Sous-le-Vent, Iles Tuamotu, Gambier et Australes, Iles Marquises. [**First Study of the Cancer Problem in French Oceania**] *Méd. Trop.* Marseilles. 1953, Sept.–Oct., v. 13, No. 5, 650–82.

PARASITOLOGY: GENERAL

See also p. 1245, Brooke *et al.* **An Amebiasis Survey in a Veterans Administration Hospital, Chamblee, Georgia, with Comparison of Technics.**

Honigberg, B. M. & Davenport, H. A. **Staining Flagellate Protozoa by various Silver-Protein Compounds.** *Stain Technology.* 1954, Sept., v. 29, No. 5, 241–6, 4 figs.

Pizzi, T. Inflamación en las enfermedades parasitarias. [**Inflammation in Parasitic Diseases**] *Bol. Chileno de Parasit.* 1954, Apr.–June, v. 9, No. 2, 54–9. [43 refs.] English summary.

The subject is rather a vague one and the author deals with it in very general terms. He considers certain examples, or types, of parasitic disease and speaks of the inflammatory reactions they produce in the tissues. He mentions the ulcers resulting from the presence and action of *E. histolytica* in the large intestine and the submucosal necrosis and the subsequent fibrosis in healing; also the effects on the myocardium of *T. cruzi* and local chagomata; of the trauma resulting from migration of certain helminths through the tissues, as larval forms of *Fasciola hepatica* penetrating the intestinal wall, Glisson's capsule and the liver tissue to the bile-ducts; of the reaction of the muscles to *Trichinella spiralis*, and of the liver and other tissues to ova of *Schistosoma mansoni*. Again, the tissues may present inflammatory reactions in relation to immunity, as the spleen in malaria. Yet again, the phenomena of hypersensitivity, of an anaphylactic type, as

in reactions used in the diagnosis of some helminthic infections, are of an inflammatory nature associated with local and general blood eosinophilia.

H. Harold Scott

Bujević, A., Cvjetanović, B. & Richter, B. Prilog poznavanju problema zaraženosti djece crijevnim crvima s osobitim obzirom na utjecaj crijevnih nematoda na nivo hemoglobina i krvnu sliku te opći razvoj djece. [**Infection of Children with Intestinal Worms with particular reference to the Effect of Intestinal Nematodes on the Haemoglobin Level, Blood Picture and General Development**] *Higijena.* Belgrade. 1953, July–Oct., v. 5, Nos. 4/5, 275–93, 1 fig. & 1 chart. [17 refs.] English summary.

A survey of helminth infection was carried out in 1952 in 2 homes for handicapped children in Zagreb, Yugoslavia. Eggs of *Enterobius vermicularis* were found in 127 of 200 children by the Scotch tape method, compared with 84 by the "Cellophane" method. Combined infection with *Trichuris trichiura* and *E. vermicularis* was found most frequently (28·1 per cent.), followed by the same 2 parasites with the addition of *Ascaris lumbricoides* (24·4 per cent.), *T. trichiura* alone (15·8 per cent.) and *E. vermicularis* alone (8·5 per cent.), of a total of 284 inmates. Protozoa were found in 40·5 per cent. (*Entamoeba histolytica*, 7·0 per cent.; *E. coli*, 20 per cent.; *Giardia intestinalis*, 15·9 per cent.; *Iodamoeba bütschlii*, 10·2 per cent.). A cure was obtained by santonin treatment in 63 [*sic.*, presumably 113] of 205 cases (56·5 per cent.) of enterobiasis, and with Egressin in 30·8 per cent.; 34 of 189 cases (18 per cent.) of ascariasis were cured with Helminal. Some fall in haemoglobin levels was noted during treatment with santonin.

D. J. Bauer

Maldonado, J. F. & Oliver-González, J. **Present Status of Intestinal Parasitism in certain Areas of Puerto Rico.** *Bol. Asoc. Méd. de Puerto Rico.* 1954, May, v. 46, No. 5, 225.

The authors tabulate the results of examining the stools of 6,150 persons in Puerto Rico by means of 2 direct smears and a concentration method.

The remarkably high incidence of some of the parasites found is shown in the following table:

	% Children (less than 15 years)	% Adults (over 16 years)
Schistosoma mansoni	23·7	19·5
Trichuris trichiura	92·0	75·5
Hookworm	27·2	24·5
Ascaris lumbricoides	31·0	14·1
Strongyloides stercoralis ...	7·0	9·0
Entamoeba histolytica (cysts)	15·4	16·1
Entamoeba coli (cysts) ...	37·1	32·8
Endolimax nana (cysts) ...	26·1	26·2
Iodamoeba bütschlii (cysts) ...	4·9	5·1
Giardia intestinalis (cysts) ...	17·1	4·9

It is clear that, despite efforts to improve conditions, the problem of parasitism in Puerto Rico has not yet been solved [see this *Bulletin*, 1946, v. 43. 1155].

H. J. O'D. Burke-Gaffney

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Colless, D. H. **Systematic Nomenclature in Medical Entomology.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1954, July, v. 48, No. 4, 344–6.

Much confusion is caused, particularly to field workers who need to identify mosquitoes involved in disease transmission, by the slipshod use of technical terms such as " variety " or " subspecies ". This paper is a plea for precision, and in particular it urges that the term " subspecies " should not be used as a " wastepaper basket for controversial forms ". A species is considered not primarily as being easily separated by morphological differences, but because it cannot breed with other forms, *i.e.*, it is defined by its actions and not its appearance, no matter how many difficulties this may cause to the systematist. *Kenneth Mellanby*

Smith, R. F. **The Importance of the Microenvironment in Insect Ecology.** *J. Econom. Entom.* 1954, Apr., v. 47, No. 2, 205–10. [35 refs.]

There has in recent years been surprisingly little work on the effects of climatic conditions on insect biology, though by ignoring many substantial European publications this paper somewhat exaggerates the situation. Three different types of microclimate are described. First that considered by the meteorologist, covering an area of perhaps several square miles. Secondly the " ecoclimate " or " plant climate " comprising the layer of air near the ground. Thirdly the " insect climate ", *i.e.*, that of the habitat occupied by the insect, which may be under the bark of a tree or inside an ants' nest. The relation between the findings in these restricted spaces and the standard data of meteorologists is discussed, and some types of instruments found useful by entomologists in North America are briefly listed. *Kenneth Mellanby*

Packchanian, A. **Altitude Tolerance of Normal and Infected Insects.** *J. Econom. Entom.* 1954, Apr., v. 47, No. 2, 230–38, 1 fig. [14 refs.]

An apparatus giving conditions of temperature and pressure simulating those found at high altitudes is described, and the effects of these conditions on arthropods of medical importance, both clean and infected with pathogenic micro-organisms, are described. The following species were used:— *Triatoma gerstaeckeri*, *Musca domestica*, *Bdellonyssus bacoti*, *Aëdes aegypti* and *Culex fatigans*. Some of the *Triatoma* were infected with *Trypanosoma cruzi* and some of the *Musca* with *Herpetomonas muscae domesticae*. Most specimens of all the species studied survived exposures of 48 hours to −5°C. and 522 mm. of mercury, which corresponded to conditions obtaining at an altitude of 10,000 feet above sea level, but lower temperatures were as a rule fatal in much shorter times. [Other workers have found little harmful effect due to reduced pressure, so the low temperature is presumably the lethal factor.] The flagellate parasites were more resistant and survived in the dead insects at lower temperatures (*i.e.*, 2 hours at −44°C. in the case of *Trypanosoma cruzi*). *Kenneth Mellanby*

Ministry of Health. **Memorandum on Measures for the Control of Mosquito Nuisances in Great Britain.** Memo. 238/Med. Revised 1954. 38 pp., 2 maps & 2 pls. [37 refs.] 1954. London: H.M. Stationery Office. [1s. 3d.]

This memorandum was first published in 1940, revised and reprinted in 1942 [this *Bulletin*, 1943, v. 40, 413], and in 1948 [this *Bulletin*, 1949, v. 46, 500]. Nevertheless, the exhaustion of the 1948 edition necessitated this further revision in which some amendments have been made, particularly with regard to mosquito control and the use of modern insecticides. In the section on mosquito control, a great part has been rewritten giving new, man-made factors responsible for the increase of mosquito breeding places and thus of further nuisance, and various ways of coping with them are recommended. Also in this edition, 33 species of mosquitoes in Britain have been reported, compared with 30 in the 1948 edition, *i.e.*, an increase of 3 species over a period of 6 years, namely *Culex molestus*, *Culex torrentium* and *Theobaldia longiareolata*. Moreover, some new biological observations were made, particularly on the subspecies of *Anopheles maculipennis*, *Aëdes flavescens* and *Aëdes dorsalis*, which were not known in England before. An error which has since been corrected is that the dosage of 0·6 lb./acre at the bottom of page 26 should be of BHC and not of its *gamma* isomer, as is stated. *G. R. Shidrawi*

Vargas, L. & Martínez Palacios, A. Mosquitos comunes a México y a los Estados Unidos. [**Mosquitoes Common to Mexico and the United States**] (Diptera: Culicidae) *Bol. Epidemiológico.* Mexico. 1953, Oct.–Dec., v. 17, No. 4, 129–34.

The English summary appended to the paper is as follows:—

"The authors record 70 species of mosquitoes common to Mexico and to the United States of America. The nine genera to which they belong are *Anopheles*, *Wyeomyia*, *Uranotaenia*, *Culiseta*, *Mansonia*, *Psorophora*, *Aedes*, *Culex* and *Deinocerites*. For each species mentioned it is recorded the distribution by States from both countries."

See also p. 1220, Cook, **Pictorial Keys to the Mosquitoes of Medical Importance. VI. Philippine Islands.**

Rozeboom, L. E. **Hybridization among Mosquitoes and its Possible Relation to the Problem of Insecticide Resistance.** *J. Econom. Entom.* 1954, June, v. 47, No. 3, 383–7. [17 refs.]

The author reviews the data on hybridization between strains and subspecies of various kinds of mosquito. The cases reviewed are: the well-known *Anopheles maculipennis* complex; the North American group comprising *Anopheles quadrimaculatus*, *A. freeborni* and *A. aztecus* [Rozeboom, this *Bulletin*, 1953, v. 50, 1116]; the *Culex pipiens* complex [Mattingly *et al.*, *ibid.*, 1952, v. 49, 651]; and the *Aëdes scutellaris* group [Marks, *ibid.*, 168]. Some new data concerning the last mentioned complex are presented. Reciprocal mass matings were tried between *Aëdes polynesiensis* and *Aëdes pseudoscutellaris*. Both types of cross were successful and produced large numbers of progeny in the F_1 and F_2 generations. The cross

with females of *Aëdes pseudoscutellaris* gave fewer F_1 eggs than the opposite cross, possibly because these females died more rapidly than did the *polynesiensis* females. It was also noted that the *Aëdes pseudoscutellaris* colony itself did not produce many eggs and, indeed, died out after the F_1 generation.

The advisability of investigating the genetics of insecticide resistance in mosquitoes is stressed and it is noted that strains with unusual habits of avoiding insecticides, etc., would be quite as important as actual resistant strains. *J. R. Busvine*

Rosen, L. & Rozeboom, L. E. **Morphologic Variations of Larvae of the *Scutellaris* Group of *Aedes* (Diptera, Culicidae) in Polynesia.** *Amer. J. Trop. Med. & Hyg.* 1954, May, v. 3, No. 3, 529–38, 13 figs. [13 refs.]

The *scutellaris* group of *Aëdes* consists of 17 species. The adults are closely similar to one another and in many cases are best determined by referring to the male terminalia. The larvae also are very similar except for that described as *A. horrescens* by Edwards. Even to the naked eye this larva is remarkably " hairy " with large stellate setae. Until now this form has been recorded from Fiji only.

The authors now report finding similar larvae in the Society Islands. When they attempted to establish a laboratory culture they revealed a curious and complicated situation. Females bred from hairy larvae and fed on man laid eggs, the larvae from which were reared on powdered bread and were not hairy. It was also found that if one took larvae in the second or third stage and reared them in the laboratory on bread, in the fourth stage they became less hairy than would perhaps have been expected. In the field hairy larvae are found more commonly in tree holes than in other breeding sites. Intermediates between the hairy and the not-hairy have been found. In the authors' view there must be some factor in the larval environment which changes it in the direction of hairiness. This factor is more frequently present in the water in tree holes than in other types of water.

The authors have found hairy larvae occasionally in what would be regarded as *Aëdes pseudoscutellaris* and *polynesiensis*.

It is shown that the hairy appearance is due not only to the presence of very large setae on the thorax and abdomen of the larvae (but not on the head) but also to the setae having a greater number of branches. There is a wide range of variation and many intermediates. Extremes are illustrated.

A detailed study has been made of larvae and of the adults bred from both types of larvae. No differences between these have been discovered. Hairy larvae have been examined not only from Fiji where *A. horrescens* was originally discovered but also from the Society Islands, Tonga and Samoa: the situation is curious, for so much collecting has previously been done in the Samoan group without these larvae being observed.

[The authors have found something very interesting and unexplained. Their view that there is an external factor which tends to increase the development of setae on the larvae is not entirely satisfying. The convincing experiment of taking a batch of eggs and rearing some larvae in one type of water and one in another has not apparently been carried out.] *P. A. Buxton*

Mattingly, P. F. & Bruce-Chwatt, L. J. **Morphology and Bionomics of *Aëdes* (*Stegomyia*) *pseudoafricanus* Chwatt (Diptera, Culicidae), with some Notes on the Distribution of the Subgenus *Stegomyia* in Africa.** *Ann. Trop. Med. & Parasit.* 1954, June, v. 48, No. 2, 183–93, 4 figs. [20 refs.]

An illustrated description is given of the larva, pupa, male and female of *Aëdes pseudoafricanus*, followed by a note on its systematic relationship with other species.

As this mosquito is a proved laboratory vector of yellow fever [this *Bulletin*, 1949, v. 46, (823)] the differences between its bionomics and those of *Aëdes africanus* may be of epidemiological significance. Both species occur in Southern Nigeria, but *A. pseudoafricanus* has also been recorded from the Banana peninsula in the Belgian Congo where, it is believed, *A. africanus* does not occur [this *Bulletin*, 1953, v. 50, 67]. From present information it seems that the restriction of *A. pseudoafricanus* to coastal swamps may be due to the fact that this species is unable to compete with *A. africanus* except where the proximity of *Avicennia* mangrove provides it with breeding places from which *A. africanus* is debarred.

Out of a total collection of 510 *A. pseudoafricanus* 392 (76·8 per cent.) were taken at ground level and 118 (23·2 per cent.) were taken on a tree platform 27 feet above ground level; at the same time 16 *A. africanus* were taken at ground level and 16 on the platform.

In the laboratory, *Aëdes luteocephalus* fed readily on man and guineapig but *A. pseudoafricanus* could not be induced to feed on either guineapig or mouse. A colony of *A. luteocephalus* was maintained through 4 generations but colonies of the other 2 species had to be kept going from the second generation by replenishments from outside; nevertheless no eggs were obtained from the third generation and the colonies were allowed to lapse.

Extra distributional records from Africa are listed for a number of species of *Stegomyia* and some of the doubtful records are discussed.

H. S. Leeson

Curtis, L. C. **Observations on Mosquitoes at Whitehorse, Yukon Territory (Culicidae: Diptera).** Reprinted from *Canadian Entomologist*. 1953, Oct., v. 85, No. 10, 353–70, 11 figs.

Whitehorse, Yukon Territory, Canada, lies at an altitude of 2000 feet at long. 135°W. and lat. 60°45′ N. on the Yukon River. A description is given of the locality and of the climate, and the mosquitoes which have been recorded in the area are listed; there are 18 species of *Aëdes*, 3 of *Culiseta*, and 1 each of *Culex*, *Mochlonyx* and *Eucorethra*. No species of *Anopheles* has been taken here but a single adult of *A. earlei* was collected further east at Fort Nelson.

Mass rearing of mosquitoes during the summers of 1949 and 1950 produced all the above species except 4 of the *Aëdes*. The rearing was carried out by using cylinders of copper wire screen with brass frames 24 inches high and 15 inches in diameter. The upper ends were closed by tight screen lids and the lower ends were open. The bottom rims were equipped with 2 perforated lugs through which iron anchor-pins passed into the substratum. These cages were placed in water about one foot deep and were kept stocked with larvae from the surrounding pool. For collecting the emerging adults a large net was held over the cage, the lid was moved aside and the mosquitoes moved up into the net. The net was then suspended mouth downwards from a nearby bush while the specimens were picked off the

inside of it and put into a jar. The jar of mosquitoes was taken to the laboratory where they were chloroformed and pinned.

The positions of the mass cage rearing sites are shown on a map and a description is given of each site.

Notes are given on the species bred out and graphs illustrate the numbers emerging and the landing and biting activity in relation to meteorological data.

It was impossible to identify many specimens because they were badly rubbed but of those identified the great majority were of 4 species: *Aëdes communis*, *A. punctor*, *A. impiger* and *A. pionips*. *A. communis* was the predominant pest species and was most active during daylight with peaks during the forenoon and at evening twilight. It was the earliest species to emerge and by August it had become replaced in importance by *A. punctor* which was the most actively nocturnal species and by *A. impiger* which proved to be of crepuscular rather than nocturnal habit. *A. pionips* was only mildly attracted to man. *H. S. Leeson*

Frohne, W. C. & Frohne, R. G. **Diurnal Swarms of *Culex territans* Walker, and the Crepuscular Swarming of *Aëdes* about a Small Glade in Alaska.** *Mosquito News*. 1954, June, v. 14, No. 2, 62–4.

In Alaska mosquito swarms are commonplace and fairly easily observed in the persistent subarctic twilight; also, in contrast to the brief swarming period of tropical mosquitoes, northern species commonly swarm for an hour or more.

At sunset, around a small bog near Chitina, Alaska, during the summer of 1953, the authors observed the swarming of *Aëdes communis*, the most abundant mosquito in the area and of *Aëdes excrucians* in the month of June; a month later a swarm of *Aëdes cataphylla* was seen, also in the evening. In August, diurnal swarms of male *Culex territans* were encountered on two afternoons but no females of this species were seen. *H. S. Leeson*

Rozeboom, L. E. & Gilford, Barbara N. **Sexual Isolation between Populations of the *Culex pipiens* Complex in North America.** *J. Parasitology*. 1954, June, v. 40, No. 3, 237–44.

There are in North America at least 3 recognizable populations of mosquitoes of the *Culex pipiens* complex: in the north, *C. pipiens*; in the south, *C. quinquefasciatus* [*fatigans*]; and *C. molestus* co-existing with *C. pipiens* at least in several localities.

Two types of breeding experiments were carried out on laboratory cultures of these mosquitoes. In the first, males of one type had an opportunity to select between 2 kinds of females. In the second the males were placed in contact with only one type of female. A 1 to 5 male to female ratio was employed to prevent the obscuring of any possible selection by a too great male activity. A 2–4 day period of contact in the cages was given and then the females were dissected and examined for the presence of spermatozoa.

In the first series of experiments the following combinations were used:—

(1) *C. pipiens* × *C. quinquefasciatus*. *C. pipiens* males and females exhibited a rather low degree of sexual activity and the difference between the numbers of 2 types of females fertilized by *pipiens* males was not significant. A significantly higher proportion of *quinquefasciatus* females were fertilized by *quinquefasciatus* males.

(2) The above crossing was repeated with a different strain of *quinquefasciatus*. Here 3 times as many *quinquefasciatus* females as *pipiens* females were fertilized by *pipiens* males and three times as many *quinquefasciatus* as *pipiens* females were fertilized by *quinquefasciatus* males.

(3) *C. pipiens* × *C. molestus*. *C. pipiens* males and *molestus* males fertilized approximately 3 times as many *molestus* females as *pipiens* females.

(4) *C. molestus* × *C. quinquefasciatus*. Significantly higher percentages of *molestus* females were fertilized by both *molestus* and *quinquefasciatus* males; there was no significant difference between the 2 kinds of females fertilized by *quinquefasciatus* males. The second strain of *quinquefasciatus* gave the same type of result.

Further experiments showed differences in the rate of sexual activity between the 2 strains of *quinquefasciatus* used.

In experiments where males were placed in a cage with only one type of female it was found that the percentage of females fertilized by their own males was approximately the same regardless of the presence or absence of females of another kind.

Although it has not been possible to demonstrate the ability of members of these populations to recognize the opposite sex of their own kind, the results do show that varying degrees of sexual activity occur and it is suggested that this factor could be the means by which each population maintains its identity. *Anne Hudson*

See also p. 1278, Charles, **Toxicity of the Botanical Insecticide** *Ryania speciosa* **to** *Culex pipiens fatigans* **Wied.**

Hamon, J. & Ovazza, M. Une nouvelle espèce de moustique (*Culex shoae* n. sp.) vivant sur les bananiers du Haut Plateau d'Éthiopie. [**New Species of Mosquito,** *Culex shoae* **in Banana Groves in the Ethiopian Plateau**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 3, 416–21, 4 figs.

Hubert, A. A., Rush, W. A. & Brennan, J. M. **Simplified Techniques for the Continuous Rearing of** *Culex tarsalis* **with Additional Notes and Observations.** *Mosquito News.* 1954, June, v. 14, No. 2, 75–8.

Culex tarsalis is a mosquito initially refractory to attempts at laboratory colonization and it is noteworthy that the authors' strain of this species has now become adapted to insectary conditions and will mate in confined spaces [for a preliminary report, see this *Bulletin*, 1953, v. 50, 1170].

In the main walk-in insectary the temperature and humidity are maintained at 70°F. and 70 per cent. respectively. Lighting is by fluorescent tubes and by a rheostat-controlled 300-watt lamp. Twilight is imitated by extinguishing ceiling lights, 15 minutes later reducing voltage from 110 to 55 and after another 15 minutes the room is completely darkened. Yeast and milk have been abandoned as larval foods and high-protein pellets substituted.

In a cage in the main room guineapigs and chickens provide blood meals for the female mosquitoes and this colony is now in its 12th generation. In another cage guineapigs only are used and this one is in its 9th generation. In a 3rd cage the females feed exclusively on man and this culture is also in the 9th generation. A 4th colony was fed entirely on a snake (*Thamnophis* sp.) and produced 3 generations before the death of the snake.

These and other miscellaneous experiments and observations showed that colonies of *Culex tarsalis* can be maintained successfully in small cages with or without controlled lighting. At room temperature the females are able

to take blood 3 days after emergence; oviposition can occur 4 days after a blood meal and eggs may hatch 3 days after oviposition. The development of eggs and pupae may be retarded for they can be held at about 32°F. for about 10 and 4 days, respectively, and remain viable. *H. S. Leeson*

Bidlingmayer, W. L. **Description of a Trap for *Mansonia* Larvae.** *Mosquito News.* 1954, June, v. 14, No. 2, 55–8, 3 figs.

An illustrated description is given of a trap for the collection of the larvae of *Mansonia perturbans*. The object of the trap is to yield quantitative data and its construction is based on the principle that *Mansonia* larvae rise to the surface of the water when no aquatic plants are available.

The trap consists of two parts, an outer galvanized metal cylinder and an inner insert that collects and holds the larvae. Two kinds of insert were tried; the first consists of a closely fitting cylinder the floor of which is composed of a number of pyramids open at the apices.

In use the outer cylinder is placed over the host plant and is pressed down into the soil. The enclosed plants are pulled up, rinsed in the water inside the cylinder and discarded. Five minutes later the insert is pushed down into the cylinder until the top is below water level. The insert is held in place by friction as its diameter is slightly less than that of the outer cylinder. The larvae which have been freed from the plants come to the surface passing up through the holes in the apices of the pyramids and are held in the chamber above. The trap is usually set for 24 hours.

The second type of insert consists of a single cone having an opening at the top and mounted by a collecting chamber riveted and soldered to it.

In the author's opinion, though the cone type is entirely satisfactory the pyramid type of insert is to be preferred, because, though it is more difficult to construct and is somewhat less efficient, it is possible to use it in as little as 4 inches of water and it usually contains less sediment and thus requires less time to examine.

In practice, it is thought that all larval instars are collected in the proportions actually occurring but pupae are rarely recovered. The number of roots still remaining at the bottom of the cylinder affects the efficiency of the trap. Moreover, it is almost certain that some larvae are lost in the discarded plant roots and litter. *Mansonia* larvae exhibit a light avoidance reaction which prolongs the time before they will commence to rise to the surface: also, the trap becomes less effective with decreasing temperatures, owing to the increasing sluggishness of the larvae as the temperature falls. *H. S. Leeson*

Tyssul-Jones, T. W. **D.D.T. as a Mosquito Larvicide and its Application in High Spreading Oils on Large Expanses of Water Sheets.** *Indian J. Malariology.* 1952, Dec., v. 6, No. 4, 395–409, 4 figs.

Ground applications of 5 per cent. DDT in oil solutions at concentrations as low as ½ gallon/acre proved to be more effective against both Culicine and Anopheline larvae than aerial spraying, owing to the filtering effect of foliage in the latter case. It was found also that DDT in high-spreading oils is more economical and efficient than straight oils because when straight oils are applied, at the recommended dosage, to the sides of ponds, rivers, etc., where mosquito larvae are normally found, the oil will spread out over the general surface. As a result, after a comparatively short period of time the film remaining at the sides becomes too thin to ensure effective control; while DDT carried in high-spreading oils remains lethal even in films of

monomolecular thickness. However, there was the difficulty of finding the necessary means to apply such small quantities on large expanses of water surfaces such as lakes, ponds, rivers and streams as well as on small discontinuous water surfaces such as puddles, water in hoof prints, seepages, etc.

In this paper an applicator for applying DDT in high-spreading oils to large expanses of water has been described, which consists of a cylinder connected at one end to a tank on the operator's back by means of oil-resisting tubing, and at the other end to a 2½ ft.-long outlet tube which is capable of delivering approximately 5 cc. of the oil solution directly to the water surface so that waste on heavily vegetated surfaces could be avoided. The following experiments on the application of DDT in high-spreading oils to discontinuous surfaces were made. Three ponds varying in the nature of their vegetative cover were taken. Five cc. of high-spreading oil at 8- to 10-pace intervals were applied all over the surfaces. Results showed that when there were no mechanical barriers lying horizontally on the surface such as grass stems, sticks or thick scum, the oil film spread all over the surface and gave a complete kill, while in the presence of these barriers a number of uncovered areas remained where larvae were found alive. Another experiment demonstrated that unsatisfactory control was due to incomplete film and not to any other factor; by clearing another area in the same pond where incomplete kill had been previously obtained and achieving a complete control after the same treatment. *G. R. Shidrawi*

Schoof, H. F. & Siverly, R. E. **Urban Fly Dispersion Studies with special reference to Movement Pattern of** *Musca domestica*. *Amer. J. Trop. Med. & Hyg.* 1954, May, v. 3, No. 3, 539–47, 4 figs.

An attempt was made to gain an insight into the manner in which flies (*Musca domestica*) accomplish their movements to distant sites.

The experiment took place in an urbanized, substandard residential zone south of Phoenix, Arizona, U.S.A., where approximately 147,000 *M. domestica* (and about 25,000 of other species) were tagged with P-32 by allowing them to feed (during a period of 24 hours) on a radio-active milk solution. These radio-active flies were released at dusk on 20th October 1952.

In the next 2 days flies were collected from 15 traps at each of 3 stations situated 0·5 mile from the primary release point. These flies were dusted with violet, green and red dyes, respectively, and then released.

To recapture the dyed, radio-active flies traps baited with chicken entrails were dispersed west, north and east within 1 mile of the original release point. Collections of flies from these traps were made 2, 4, 6 and 9 days after dusting.

A total of 6,408 radio-active undyed house-flies was retrieved representing a recovery of 4·4 per cent. of the number liberated. Approximately 52 per cent. of these recaptured tagged flies were taken within 0·5 mile of the primary release point.

Recoveries of radio-active, coloured flies amounted to 104; on the basis of data obtained from previous dispersion studies this figure is calculated to represent a recovery rate of 7·3 per cent., nearly twice that for flies recovered from the primary release site (4·4 per cent.).

The movement of the flies from each secondary release site is illustrated and recoveries were made as long as 5–7 days after liberation.

In discussing the results the authors show that house-flies are essentially insects of migrating habits and arrive at their destinations through devious

movements, the pattern of dispersion initially involving a random movement from the point of origin until it reaches a site providing the necessary stimuli for a temporary cessation of migration. The same sequence of incitation and response occurs at each succeeding site until terminated by the death of the individual. It is suggested that house-flies frequently accumulate travel of 15 miles or more during the course of their existence.

The significance is discussed of this roaming habit in disease transmission and from the point of view of control. *H. S. Leeson*

Varzandeh, M., Bruce, W. N. & Decker, G. C. **Resistance to Insecticides as a Factor influencing the Biotic Potential of the House Fly.** *J. Econom. Entom.* 1954, Feb., v. 47, No. 1, 129–34, 1 fig.

Sanitarians and others concerned in house-fly control, are very interested in the future status of insecticide resistance after the tolerated insecticide has been abandoned or replaced. It seems probable that the maintenance or decline of resistance in the population, in the absence of selection, will depend on whether this character is genetically bound up with other physiological characters detrimental (or possibly favourable) to the flies. Certain workers have suggested, for example, that resistant flies have a longer life cycle [this *Bulletin*, 1952, v. 49, 90, 1159], which might possibly be a handicap.

The authors have reinvestigated this question, taking 3 different strains of susceptible house-flies and 4 strains resistant to the following insecticides: (1) pyrethrins, (2) *gamma* BHC, (3) several chlorinated hydrocarbon insecticides, (4) DDT.

The rearing methods are described in some detail. The following biological characters were measured in 4 series of tests with 6 replicates of each strain of fly: (a) number of eggs per female; (b) dry weight of pupae and (c) adults; (d) adult longevity (male and female); (e) per cent. mortality of eggs, (f) of larvae and (g) of pupae.

The results of these tests were statistically analysed and showed strong correlation between characters indicating general " vigour ". In other words, some strains combined low egg production, small size, short survival and high mortality in developmental stages; other strains showed the opposite. There was, however, no correlation between any of the bionomic characteristics and insecticide resistance.

The authors conclude that combination of characters for " vigour " and resistance or the reverse is a purely fortuitous matter and any type of strain might be selected according to circumstances.

[It is not, perhaps, surprising that large flies would produce more and possibly healthier eggs and larvae. House-fly colonies vary very much owing to the complex nature of the breeding medium which cannot be standardized. The authors have not made it clear whether the " vigour " characters were truly genotypic, or whether they were the result of good and bad batches of flies.] *J. R. Busvine*

Langford, G. S., Johnson, W. T. & Harding, W. C. **Bait Studies for Fly Control.** *J. Econom. Entom.* 1954, June, v. 47, No. 3, 438–41.

Further good results with phosphorus insecticides in cattle barns [see Gahan *et al.*, this *Bulletin*, 1954, v. 51, 1202].

i. Hoffman, R. A., Hopkins, T. L. & Lindquist, A. W. **Tests with Pyrethrum Synergists combined with some Organic Phosphorus Compounds against DDT-Resistant Flies.** *J. Econom. Entom.* 1954, Feb., v. 47, No. 1, 72–6.

ii. Eddy, G. W., Cole, M. M. & Marulli, A. S. **Louse Powder Synergists. Tests of Synergists with Phosphorus Compounds against the Body Louse increased the Initial Activity 10 Times.** *Soap.* New York. 1954, July, v. 30, No. 7, 121–3, 143–5.

i. Nineteen compounds which are either in use as synergists for pyrethrins or have shown promise in laboratory tests were examined for synergic effect on 7 phosphorus compounds, against DDT-resistant flies. Batches of these insects were exposed for 10 minutes in glass jars treated with the insecticides alone or with various ratios of synergist (up to 10 times the amount of insecticide). The effects were judged from the mortalities observed 24 hours later. The phosphorus insecticides tested were; malathion, EPN, methyl parathion, potasan, " Diazinon " and the Bayer compounds 21/199 (3-chloro-4-methyl umbelliferone O,O-diethyl thiophosphate) and 21/200 (as before but -dimethyl thiophosphate).

It was found that most of the chemicals known to synergize pyrethrum compounds would also improve the effectiveness of the phosphorus insecticides. Particularly good were piperonyl butoxide, sulphoxide, *alpha*-piperonyl ester of chrysanthemumic acid and 5-butyl-5-ethyl-2-(3,4-methylene dioxyphenyl) *m*-dioxane. Curiously enough, piperonyl cyclonene was very inactive (in contrast to the butoxide).

It was observed that some of the synergists were more effective with certain phosphorus compounds than with others.

ii. The high toxicity of some phosphorus insecticides renders them quite unsuitable for use against ectoparasites; but some newer compounds of this type are no more dangerous than DDT and may prove valuable in use against DDT-resistant lice. Synergists to increase their effectiveness would be useful.

Twenty-two compounds, mostly known to have synergistic action with pyrethrins, were tested for their effect on phosphorus compounds. The tests were done with human body lice reared by feeding on rabbits. The lice were exposed to dry residues on cloth dipped in acetone solutions of the compounds or to insecticide powders rubbed into pieces of cloth. The synergist-insecticide ratio was generally 10:1. Most tests were done with potasan and Bayer compounds 21/199 and 21/200.

These three compounds readily responded to the synergists, especially to sulphoxide and 1,2-methylenedioxy-4-[2-(octylsulphonyl) propyl] benzene. As in paper I, the effectiveness of the different synergists varied from one insecticide to another. The most effective synergist for the three insecticides mentioned was not appreciably active with other phosphorus insecticides such as parathion, malathion or EPN. *J. R. Busvine*

i. Fales, J. H., Bodenstein, O. F. & Nelson, R. H. **The Synergistic Action of Sulfoxide in Insecticide Sprays and Aerosols.** *J. Econom. Entom.* 1954, Feb., v. 47, No. 1, 27–9.

ii. Eddy, G. W., Cole, M. M. & Burden, G. S. **Synergists with Allethrin against the Body Louse.** *J. Econom. Entom.* 1954, June, v. 47, No. 3, 501–6.

i. Sulphoxide (*n*-octyl sulphoxide of *iso*-safrole) was tested as a synergizing ingredient of sprays and aerosols for pyrethrines or allethrin, against

house-flies, *Culex pipiens*, *Anopheles quadrimaculatus* and cockroaches. The results showed that it was about as effective as piperonyl butoxide, being slightly better in some cases and less effective in others.

ii. Laboratory tests were made of some 200 compounds as possible synergists for allethrin against the body louse. The synergist-insecticide combinations, in a ratio of 10 to 1, were tested as residues on cloth dipped in acetone solutions or as powders. In addition to the enhancement of toxicity, the effect on residual action was noted. On the former basis, 11 compounds were found more effective than the standard synergist sulphoxide. On the basis of prolonged residual action, the 9 compounds were as good or better than sulphoxide, namely: 1,2-methylenedioxy-4-[2-(octylsulphonyl)propyl]benzene; dibutyl piperonylidene ester of malonic acid; and seven different esters of chrysanthemumic acid. *J. R. Busvine*

Eddy, G. W., McGregor, W. S., Hopkins, D. E., Dreiss, J. M. & Radeleff, R. D. **Effects on some Insects of the Blood and Manure of Cattle fed certain Chlorinated Hydrocarbon Insecticides.** *J. Econom. Entom.* 1954, Feb., v. 47, No. 1, 35–8.

Previous workers have investigated the possibility of killing blood-sucking insects by feeding their hosts with insecticides [see de Meillon, this *Bulletin*, 1947, v. 44, 469; Knipling *et al.*, *ibid.*, 1948, v. 45, 815]. Some current experiments on the toxicity of various insecticides to cattle offered an opportunity to the authors to do further tests of this kind; and to examine the cattle faeces for toxicity to fly maggots. The cattle were being fed on diets containing up to 100 p.p.m. of various chlorinated insecticides which were added to their food in acetone solution. Most of the tests were done after the cattle had been fed for 50 to 80 days on the treated diet and a few experiments were made after changing to untreated food.

The direct effect of blood feeding was investigated only with *gamma* BHC. It was found that the blood of cattle fed on 100 p.p.m. of this compound was lethal within 5 hours to all hornflies (*Lyperosia irritans*) which fed on them. There were also fairly high mortalities of *Stomoxys calcitrans* and *Aëdes aegypti* fed on these animals. The blood of animals fed on 10 p.p.m. *gamma* BHC was not insecticidal.

Experiments with faeces collected from various cattle gave the following results. House-flies were able to develop normally on dung from animals consuming 100 p.p.m. *gamma* BHC. Faeces of cattle on a diet containing 25 p.p.m. dieldrin or aldrin completely suppressed development of maggots of *Lyperosia* and killed *Stomoxys* and most *Musca* during emergence from pupae.

Dung from cattle on 25 p.p.m. chlordane or 100 p.p.m. toxaphene allowed normal development of *Musca* and *Lyperosia*.

None of the insecticide diets prevented invasion of the cattle hides by cattle grubs (*Hypoderma lineatum*). *J. R. Busvine*

Woke, P. A. **Observations on Central American Biting Midges (Diptera, Heleidae).** Reprinted from *Ann. Entom. Soc. of America.* 1954, Mar., v. 47, No. 1, 61–74, 2 figs.

Biting midges are a serious nuisance in the coastal region of parts of Central America. The author's purpose is to supply biological information,

particularly on breeding places, in order to facilitate control. The principal species in the Canal Zone, Panama, is *Culicoides furens*, particularly abundant near sea beaches and marshes. The author points out that the breeding place within that zone might be relatively high or low on the slope which is exposed to the tide; it might also be covered with mangrove (*Rhizophora mangle*) or entirely without vegetation.

Samples of mud were taken with a metal scoop to a depth of a quarter of an inch because practically all larvae are in that stratum. Each sample consisted of one quart of material and rather over 150 samples are included in the tabulation. Larvae of *Culicoides*, mostly *C. furens*, were found to be much more common in the zone which was covered by the tide on about half the days in the month than in the zones either a little higher or a little lower. The zone in which the larvae were commonest was one with a tidal elevation of about 15 ft. The above figures are all from mud flats without any mangrove bushes. Where the samples were taken from the mangrove area and from a zone corresponding to the one most favoured by the larvae, extremely few larvae were found. Five other species of *Culicoides* are recorded from the same area in the Panama Canal Zone and also a considerable number of other Heleid midges not known to bite man. *P. A. Buxton*

Lea, A. O., Jr. & Dalmat, H. T. **Screening Studies of Chemicals for Larval Control of Blackflies in Guatemala.** *J. Econom. Entom.* 1954, Feb., v. 47, No. 1, 135–41, 2 figs.

The authors describe a laboratory method of testing insecticides, with the use of larvae of *Simulium downsi* collected from streams. The larvae are picked off vegetation and put into small 3 × 1 inch glass tubes, closed at one end by a circle of " Grade 80 " cheesecloth. Thus, in batches of 25 they are immersed in the insecticide solution under test for 30 minutes (or less, if desired). The testing tubes are removed and rinsed by flushing water through them for 15–20 minutes. A piece of leaf is now put in the open end of each tube and this is closed by fresh gauze. The tubes are inverted and the larvae flushed down to the clean gauze from the old piece, which is discarded. The new top is closed with a cork, pierced by a tube which supplies a gentle stream of water over the larvae at the lower end, on the piece of leaf. In this way, larvae will nearly all survive 36 hours in controls, though some begin to die at 48 hours.

By this method a number of insecticides were tested at 10 and 1 p.p.m. The solutions were prepared by making 1 per cent. stock solutions of various substances and diluting with water. For the stock solvents, acetone, alcohol or methylene chloride were usually employed, as many organic solvents were themselves too toxic to be used.

About 800 compounds have been tested by this method. The most toxic substances were EPN, methyl parathion, parathion, " Metacide " and " sulfotepp." Slightly less effective were dieldrin, aldrin, TEPP, DDT, heptachlor, chlordane and malathion. Finally, *gamma* BHC, toxaphene, methoxychlor, DDD and schradan were rather less toxic to the larvae.

The susceptibility of the larvae varied from season to season. In the rainy season, the violent torrents dislodged many of the weaker and smaller larvae, so that those collected were more robust and generally less susceptible to insecticides.

Preliminary field trials gave results consistent with laboratory tests, but rather lower concentrations were effective in the field. *J. R. Busvine*

Mitra, R. D. Die medizinische Bedeutung der Phlebotomen. [**The Medical Importance of** *Phlebotomus*] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1954, July, v. 5, No. 3, 307–17. [Numerous refs.]

Barretto, M. P. Sôbre a sinonímia de flebótomos americanos (Diptera, Psychodidae). (Terceira nota.) [**The Synonymy of American** *Phlebotomus*] *Folia Clin. et Biol.* S. Paulo. 1953, Dec., v. 20, No. 3, 209–13. [14 refs.]

Le Gac, P. Distribution géographique de *Thrombicula legaci*, Marc André 1950 en Oubangui-Chari. [**Geographical Distribution of** *Trombicula legaci* **in Oubangui-Chari**] (A.E.F.). *Bull. Soc. Path. Exot.* 1954, v. 47, No. 3, 414–16.

[See this *Bulletin*, 1951, v. 48, 762.]

Kerr, R. W. **A Method for the Topical Application of Small Measured Doses of Insecticide Solutions to Individual Insects.** *Bull. Entom. Res.* 1954, June, v. 45, Pt. 2, 317–21, 5 figs. on 2 pls.

One precise method for the comparison of insecticides is by topical application, that is to say by applying a measured amount of insecticidal solution to some particular spot on the body of individual insects. The present author has already described a microburette the meniscus of which was observed with a microscope with an eyepiece micrometer. The device would hold a considerable number of doses and one could apply doses as low as 0·01 µl. to *Drosophila*. One could not, however, view the insect and the image of the burette in the same field of vision.

In the present paper the author describes and figures an improved microburette which overcomes this difficulty and enables much smaller quantities of fluid to be dispensed. *P. A. Buxton*

LABORATORY PROCEDURES

Charmot, G., Toury, J., Camain, R. & Giudicelli, P. Valeur du test au rouge colloïdal chez l'Africain. Confrontation avec des ponctions-biopsies hépatiques. [**The Significance of the Colloidal Red Test in Africans, compared with Liver Biopsy**] *Bull. Méd. de l'Afrique-Occidentale Française*. 1953, v. 10, 179–88.

The following is a translation of the authors' summary:—

The colloidal red test is always or nearly always positive in mesenchymatous or sclerotic abnormalities in the liver, but—at any rate in Africans—it is not specific for these changes and may be positive in apparently normal persons. Evidently it simply reflects the increase of γ globulins which is usual in Africans.

There seems to be little point in expecting to find in the blood a true reflection of the histological changes in the liver, which liver biopsy alone can provide with accuracy and beyond doubt. *H. J. O'D. Burke-Gaffney*

Charmot, G., Busson, F., Maseyeff, R. & Giudicelli, P. Application de l'électrophorèse sur papier à l'étude de la protéinémie chez l'adulte africain. (Comparaison avec l'Européen.) [**Application of Filter-Paper Electrophoresis in the Study of Blood Proteins in Adult Africans, compared with Europeans**] *Bull. Méd. de l'Afrique-Occidentale Française.* 1953, v. 10, 153–63.

The following is a translation of the authors' summary:—

Paper electrophoresis in a simple technique may be usefully combined with flocculation reactions in the study of the protein equilibrium in the blood. It is first necessary to determine the values in the normal African adult. A relative as well as an absolute increase of γ globulins and a decrease of albumin were constantly found; the extreme limits which could be considered as normal have yet to be determined.

H. J. O'D. Burke-Gaffney

Linhard, J., Busson, F., Giraud, P. & Guyonnet, C. Dosage du calcium sérique. Application aux sérums d'Africains de Dakar. [**Application of a Method of estimating Serum Calcium to the Sera of Africans in Dakar**] *Méd. Trop.* Marseilles. 1953, July–Aug., v. 13, No. 4, 520–25, 1 fig. [17 refs.]

The authors describe in detail a method of estimating calcium in the serum and give the results of tests made on the sera of 293 Africans and 24 Europeans in Dakar; all were young adults and in apparently good health. The average figure for Africans was 9·2 mgm./100 cc. and for Europeans 9·8 mgm./100 cc.

H. J. O'D. Burke-Gaffney

Linhard, J., Busson, F. & Giraud, P. Dosage du magnésium sérique. Application à des sérums d'Africaine de Dakar. [**Application of a Method of estimating Serum Magnesium to the Sera of Africans in Dakar**] *Méd. Trop.* Marseilles. 1953, July–Aug., v. 13, No. 4, 526–9, 1 fig. [17 refs.]

The authors describe in detail a method of estimating magnesium in the serum and give the results of tests made on the sera of 95 apparently healthy Africans and 10 Europeans in Dakar. The average figure for Africans was 2·11 mgm./100 cc. and for Europeans was 2·15 mgm./100 cc. [the normal level for Europeans is incorrectly stated as 18 to 25 mgm. " per 100 ", instead of 18 to 25 mgm. " per 1,000 "].

H. J. O'D. Burke-Gaffney

REPORTS AND SURVEYS

Congo Belge. Rapport Annuel de la Direction Générale des Services Médicaux—1953. [**Annual Report of the Medical Directorate General, 1953**] 120 mimeographed pp. [1954.]

The staff position continues to improve generally and the shortage of hygiene staff recorded in the last Report [this *Bulletin*, 1954, v. 51, 236] is being made good by the training of several medical officers in special courses for this purpose. An all-round increase in the principal infectious diseases

is recorded: in many cases the increase is considerable, but can usually be accounted for by improved facilities for diagnosis. Some of the more important figures for incidence in Africans were as follows (the 1952 figures being shown in brackets): *amoebiasis*, 28,457 (11,534); *bacillary dysentery*, 6,767 (1,897); *brucellosis*, 156 (32); *relapsing fever*, 1,166 (343); *poliomyelitis*, 707 (592), and in Europeans, 29 (11). The increase in *leptospirosis* was however not maintained as only 43 (117) cases were reported. On the other hand, syphilis which in 1952 amounted to 15,226 cases and exceeded that figure only once in the previous 10 years, increased to 41,898 cases in 1953. *Infective hepatitis* increased in both races: in Europeans there were 153 (62) cases and in Africans there were 3,603 (508) cases. *Tuberculosis* showed an increase from 5,901 to 13,344 cases in Africans. On the other hand, the death rate fell from 13·35 to 9·21 per cent., the lowest in the 14 years recorded. *Plague* showed a slight increase in the Lake Albert focus from 22 to 24 cases with 15 (19) deaths. In the Lake Edward focus there were 5 cases, all fatal, compared with 11 (10 fatal) in 1952. It is stated that plague in the Lake Albert area is essentially murine, as *Pulex* irritans does not occur and the local flea *Ctenocephalides strongyllus* does not seem to be able to transmit infection. The sporadic cases in man are therefore "accidental". Streptomycin continues to be successful in treatment and resulted in the cure of all of 9 patients given massive doses, irrespective of the type of plague.

Foreami has now, by agreement with Fopdera (*Fondation Père Damien*), set up a special leprosy control section. It is believed that there are now over 200,000 cases of leprosy, compared with an estimate of less than 90,000 in 1949. This increased recognition is attributed largely to the confidence inspired in the people by the spectacular alleviation of the disease which has followed the use of the new drugs. A very large campaign of control is being developed and this envisages the isolation of about 40,000 patients representing 18 per cent. of cases of leprosy. The remaining 82 per cent. will be treated as ambulatory patients in their own treatment centres.

Rickettsial diseases amounted in Europeans to 162 (90) cases and in Africans to 423 (218).

The usual large number of cases of yaws and helminthic diseases is recorded, with very large increases in numbers of cases in most of them. Since viscerotomy was authorized in 1942 in the cases of certain deaths suspected of being due to *yellow fever*, 21,000 liver biopsies have been made in the special laboratory at Stanleyville and 30 cases of yellow fever found. In 1953, 8 cases, all fatal, were found among 1,466 liver biopsies, all in unvaccinated persons. Four cases occurred in the Equator province, 3 in the Eastern and 1 in Kivu. In these areas, 361 serum tests gave from 5·5 to 26·6 per cent. positive results.

The number of cases of *malaria* in Africans increased from 293,579 to 688,841 and the death rate increased from 0·29 per cent. to 0·32 per cent. In Europeans there were 6,939 (4,051) cases with 12 (11) deaths, a rate of 0·17 (0·27) per cent.

In general, house spraying was found to be the best method of control for use in the Congo as a whole. After 2 years of regular spraying parasite indices fell from 90–100 per cent. to 20 per cent., after an average dose of DDT of less than 100 gm. per head per annum. While the method is the simplest and most economical, some areas have been found where it was ineffective. This is attributed to mosquito behaviour (*résistance de comportement*), that is, the mosquitoes do not rest on the treated walls, but go outside: in such cases aerial spraying from helicopters has been effective. Larval breeding sites which are *enclaves* in vegetation are attacked with

portable fumigators. The use of prophylactic pyrimethamine continues to be encouraging and results so far suggest that the effects are lasting.

New cases of trypanosomiasis amounted to 3,804 (5,242). The endemicity rate fell to a new record of 0·06 per cent. (0·08). This reflects the continued efficacy of pentamidine prophylaxis, but the results varied and as sleeping sickness is liable to reappear where it is unsuspected, vigilance cannot be relaxed. Details are given for each province.

A nutrition research laboratory has been set up by Foreami, with the principal object of studying kwashiorkor and of assessing scientifically the good results of the mass distribution of skimmed milk [this *Bulletin*, 1954, v. 51, 91]. The milk treatment resulted in a gain in weight and an increase in serum protein and in haemoglobin values in infants and young children. In nursing mothers these effects were not generally noted, though loss of weight was commonly prevented and a slight gain recorded. The principal value of the skimmed milk in nursing mothers was in the more abundant secretion and better quality of their own milk.

The report contains the usual full account of activities of government and non-governmental medical institutions and the work of the hygiene section in controlling vectors of disease. *H. J. O'D. Burke-Gaffney*

Reynier, C. Tiout (Sud oranais). Étude historique, géographique et médicale. [**Historical, Geographical and Medical Study of Tiout, Southern Oran**] *Arch. Inst. Pasteur d'Algérie.* 1954, June, v. 32, No. 2, 107–41, 3 text figs. & 7 figs. on 4 pls. [20 refs.]

The small oasis of Tiout is situated just off the great Oran-Colomb-Bechar highway, 18 kilometres east of Aïn-Sefra. An interesting account is given of the history of the *ksar* (fortified place) of Tiout from Roman times to the beginning of this century when General Lyautey finally succeeded in bringing order to this troubled region: since then Tiout has enjoyed unbroken tranquillity and growing prosperity.

The village is situated on the banks of the *oued* Tiout in the middle of a plain some 22 kilometres broad surrounded by ranges of hills. The summers are hot and the winters cold but frost is rarely experienced. The average annual rainfall is 135 mm.

An excellent description is given of the *ksar*, its numerous tombs and rock carvings.

The population is for the most part Berber; there are some Negroids of obscure origin. Together they number 630. It is a poor population living for the most part on garden produce: they possess but little livestock. Very few houses are built of stone; most are of mud. The manners and customs of the people are graphically described.

The well-irrigated gardens yield abundant crops of cereals and vegetables. Barley is the chief crop grown. A great number of fruit trees of many varieties produce fruit of excellent quality well in excess of local needs. There are some 3,000 palm trees, perhaps the most important resource of the community. Goats and sheep are few; many families raise chickens or rabbits. Surplus produce is disposed of in Aïn-Sefra or in Colomb-Bechar.

Tiout is visited twice monthly by the chief medical officer of Aïn-Sefra. There is a resident Mussulman hospital assistant and a first-aid post, a maternity and child welfare service, and the visiting doctor undertakes the medical supervision of schoolchildren and smallpox vaccination.

Tiout was once considered to be the most malarious oasis in this region. In 1921 about half the children and a third of the adults were found to be infected with *Plasmodium vivax*. Since then surveys have revealed very

varying conditions: in some years spleen and parasite rates have been almost negligible. The only local vector found is *Anopheles hispaniola*. This mosquito formerly bred abundantly in some marshy land above one of the 4 dams that were constructed across the *oued* for irrigation of the gardens. Canal construction rectified this and subsequent variations in malaria prevalence seem to have been in part connected with the amount of attention given to the upkeep of irrigation channels. In 1953, of 91 children examined only one had an enlarged spleen, and the 25 children whose blood was examined showed no evidence of infection. Diligent search failed to reveal any anopheline breeding in that year. *Gambusia holbrooki* was introduced in 1935 and flourished exceedingly; they are now numerous in nearly all water channels. Nivaquine [presumably chloroquine sulphate] is administered to all children as a prophylactic.

Typhus fever occurs from time to time: in March 1945 there were 23 cases, the largest and the last outbreak that has been recorded. Relapsing fever has never been reported. No case of oriental sore has been observed though *Phlebotomus papatasi* has been found. Typhoid fever appears sporadically. Cases of smallpox have been seen. Brucellosis (*Br. melitensis*) is prevalent. Cutaneous reactions reveal a relatively low tuberculosis infection rate which has shown but little change during the past 23 years. Trachoma is extremely prevalent.

Two poisonous snakes, *Cerastes cerastes* and *Vipera lebetina* cause some casualties each year, but fatal cases are rare. Three species of scorpions are found. Before serum was available fatal cases of scorpion sting occurred each year; these fatal stings were inflicted by either *Androctonus australis hector* or *Androctonus æneas æneas*. *Norman White*

BOOK REVIEWS

Simmons, James Stevens [B.S., M.D., Ph.D., Dr. P.H., Sc.D.(Hon.)], Whayne, Tom F. [A.B., M.D., M.P.H., Dr. P.H.], Anderson, Gaylord W. [A.B., M.D., Dr. P.H.] & Horack, Harold Maclachlan [B.S., M.D.], with Ruth Alida Thomas, B.A., A.M., M.P.H. & collaborators. **Global Epidemiology. A Geography of Disease and Sanitation. Vol. 3. The Near and Middle East.** pp. xxiv + 357, numerous maps. 1954. London: J. B. Lippincott Co., Aldine House, Bedford Street, W.C.2. [96s.] [This review appears also in the *Bulletin of Hygiene*, 1954, v. 29, 1124.]

The first and second volumes of *Global Epidemiology* were published in 1944 and 1951 respectively. The first dealt with India and the Far East, the second with Africa and adjacent Islands [see this *Bulletin*, 1946, v. 43, 86; 1952, v. 49, 741]. This latest volume is concerned with the Near and Middle East, under which designation are included Cyprus, Iraq, Israel, the Hashemite Kingdom of the Jordan, Lebanon, Syria, Afghanistan, Iran, Turkey, Aden Colony and Protectorate, Bahrain, Kuwait, Muscat and Oman, Qatar, Saudi Arabia, Trucial Oman, and Yemen. The information has been gleaned from government reports, reports of international agencies, scientific articles published in American and other journals, United Nations reports, books dealing with some territories in the area and from private sources. Miss Thomas visited most of the countries concerned and collected much of the recent data. The book is up to date.

The plan of the present volume follows that adopted in its predecessor. Notes on geography, climate, social and economic factors which affect the health and welfare of the people are followed by sections describing environmental sanitation, local health administration, medical and research facilities and the chief diseases of local importance.

The greater part of the large area surveyed, which contains a population of more than 75 million, is, with a few notable exceptions, very backward from a public health point of view and the standard of living is low by any modern standard. In very few places are there any reliable morbidity or mortality statistics. The fact, however, that it has been possible to assemble so much scientific information concerning disease prevalence in vast areas about which so little was known in the not remote past is striking evidence of progress realized in recent years.

Altogether it is an admirable compilation. As a book of reference it should prove of very great value at a time when so many Near and Middle Eastern problems are engaging world attention.

The chapter *Health Hints for the Tropics*, by Dr. G. K. Strode and collaborators, which appeared in Volume II, is reproduced.

Norman White

Mackie, Thomas T. [M.D.], Hunter, George W. [Ph.D.] & Worth, C. Brooke [M.D.]. **A Manual of Tropical Medicine.** 2nd Edition. pp. xxii + 907, 304 figs. (7 coloured). 1954. Philadelphia & London: W. B. Saunders Co. [60s.]

The first edition of this Manual was published in 1945 [see this *Bulletin*, 1945, v. 42, 665], and proved its value at once. It was written with the needs of officers of the armed forces in mind, but it was also planned as a manual for physicians practising in the tropics, and for students. The second edition has been very thoroughly revised, much of it having been rewritten; it contains 907 pages and 304 illustrations, against 727 and 287 in the first edition. It is printed on art paper throughout and the type face (which has been changed) is even clearer than before. The original, amusing and informative diagrams of the life histories of many of the parasites have been retained, and the photographic illustrations are superb.

In reviewing a book the reviewer should indicate its scope, should give an opinion on the value of the subject matter, and should say whether the authors' exposition is, in his view, satisfactory. The importance of the subject of tropical medicine, of course, is undisputed in hot countries, and is far greater than many hospital administrators and medical authorities in Britain realize, and the subject matter of the present volume may therefore be accepted, but the scope needs definition. This book contains information on more than the diseases conventionally regarded as tropical—for instance, smallpox, lymphogranuloma venereum, infectious hepatitis, the arthropod-borne encephalitides, poliomyelitis, mumps and some other virus diseases, leptospirosis, food poisoning, brucellosis, various fungus infections, certain vitamin deficiency states, granuloma inguinale and scabies.

The order of this second edition remains the same as that of the first:—virus, rickettsial, spirochaetal, bacterial, mycotic, protozoal, and helminthic diseases; miscellaneous conditions (including tropical ulcer, epidemic haemorrhagic fever, the effects of heat and certain medically important animals); medically important molluscs and arthropods; and some laboratory diagnostic methods. It is a comprehensive list.

The style of writing is lucid and easy, and the layout makes for clarity in that the various divisions of each subject are marked by headings in bold type—distribution, epidemiology, pathology, treatment, etc.

There is little to criticize, but a few points may be made. In the section on hepatitis there is no reference to the form transmitted by injection; in the distribution of yellow fever the great Sudan epidemic is not mentioned; the description of bejel is poor, and there is no explanation of the mode of spread; under the treatment of leprosy there is nothing about the eye conditions, or surgical methods, and village settlements, so important in rehabilitation, are not mentioned; the suppressive dose of chlorguanide (proguanil) is given as 0·3 gm. once each week, but modern practice has for some years been to give 0·1 gm. each day, and even this is regarded as too low in parts of Nigeria—this is a serious flaw; the epidemiology of non-periodic *W. bancrofti* infection is skimpily described; there is no real indication that *Schistosoma mansoni* infection is a more serious affair than *S. haematobium* infection—and indeed, one receives the impression that many of these tropical diseases are interesting and important phenomena rather than human ailments involving suffering.

The preventive side is not neglected, and the long section on medically important arthropods (which occupies 160 pages) contains much clear and detailed instruction on methods of control.

The last section, on some laboratory diagnostic methods (50 pages), is most useful.

The book is excellent and can be recommended without reservation.

Charles Wilcocks

Roy, D. N. [M.D., D.T.M., D.Sc.] & Brown, A. W. A. [M.B.E., Ph.D.]. **Entomology (Medical and Veterinary) including Insecticides and Insect and Rat Control.** 2nd Edition. pp. ix + 413, numerous figs. & pls. 1954. Calcutta–12: Excelsior Press, 11A, Hidaram Banarjee Lane. [Rs. 30; 45s.; $8.00.]

The primary object of this new edition is to cater for the needs of the medical and veterinary entomologists of India but " information on similar lines in respect of other countries has also been incorporated though in a comparatively brief manner ".

The work is in two parts. Part 1, by Professor Roy, on medical and veterinary entomology, occupies 290 pages and is illustrated with 192 text figures and 8 unnumbered plates. After the introduction to the subject there is a description of external and internal insect anatomy. The cockroach, *Periplaneta americana*, is selected for preliminary study as being typical of the class Insecta. Details of classification are given as well as lists of insect vectors of disease organisms. The plan then follows much the same pattern as in the first edition which was published in 1946 [this *Bulletin*, 1946, v. 43, 871]. The chapter on *Anopheles* deals almost exclusively with Indian species but in the rest of this part there are descriptions of the other insects and accounts of their life histories, bionomics and notes on control. This part closes with some useful notes on entomological technique.

The text has been revised and brought up to date; certain errors which occurred in the earlier work have been corrected and omissions amended. The arrangement and typography are greatly improved and make the book easy to use. The selection of suitable type has also made it possible to get more information on to fewer pages.

An obvious misprint occurs in the heading to page 161. Figure 7 would look better the other way up. The captions to figures 113 and 114 should be transposed and the drawing of the hind tarsus of *Glossina morsitans*

should have both segments 4 and 5 dark. *Babesia bigeminum* is mentioned on page 247 and *B. bigemina* on the next page; similarly, the name *Cyclops leuckarti* occurs on page 280 and *Mesocyclops leuckarti* on page 281. Beginners are apt to be confused by such inconsistencies which, no doubt, will be put right in later issues.

Part 2, by Professor Brown, is a new addition to the volume and deals with insecticides and insect and rat control in 115 pages with 2 text figures and 6 plates. Among the subjects covered in this part are a brief history of insecticides and then, more fully, their chemistry, toxicology, testing and formulation. Accounts are also given of the latest methods of carrying out insecticidal control of noxious Diptera such as mosquitoes, sand-flies, black-flies, house-flies, biting and parasitic flies on livestock and of other species including fleas, lice, bugs, mites and ticks. Finally there is a section on rodent control in which two points are emphasized so far as rats in buildings are concerned. Firstly, poisoning will only achieve permanent results if the buildings are rat-proofed and secondly, in most cases control will be accomplished by laying down baits. Short notes deal with package deterrents and field rodents. Illustrations are given of some pieces of apparatus and of some methods of application. The author has been wise to include a section on the hazards of accidental poisoning of human beings by insecticides.

In both parts references are listed at the ends of the appropriate sections and the complete volume makes a practical working textbook for medical and veterinary students as well as for health officers and others engaged in any field or laboratory work which is concerned with the identification and control of harmful insects and rodents, not only in India, but also (with the exception of species of anopheline mosquitoes) to a helpful extent in other countries.

H. S. Leeson

Trowell, H. C. [M.D., F.R.C.P.] **A Handbook for Dressers and Nurses in the Tropics.** 3rd Edition. Illustrated by Margaret Trowell. pp. xii + 660, 166 figs. 1953. London: The Sheldon Press, Northumberland Avenue, W.C.2. [18s.]

An article by Dr. C. C. Chesterman [this *Bulletin*, 1954, v. 51, 123] and a recent discussion at the Royal Society of Tropical Medicine and Hygiene on the subject of the Training of Medical Assistants in Africa have drawn attention to the very great importance of the subject.

It has been pointed out that nurses and medical assistants have an enormously important part to play where doctors are few, and the training and supervision of ancillary workers is mainly the responsibility of the doctors. However, this training is often left to the least experienced, most junior members of the medical staff, many of whom have no teaching experience and less vocation. Chesterman came to the conclusion that it is easy enough to teach these workers the facts of physiology and pharmacology, but it is much more difficult to teach them how to be (a) kind to patients and (b) honest with drugs. Considering the lack of attention and of finance that has been devoted to the subject, it is astonishing how efficient some of these workers are.

Many of those in training will have not only nursing duties to perform, but will also be placed in dispensaries and hospitals where they will have to make diagnoses and undertake treatment and be responsible for all the records. It is obvious that with their different background, their different problems, and their different functions, the conventional training of the "State Registered Nurse" in Britain is inadequate and may be unsuitable.

Dr. Trowell's Handbook has gone through three editions, which is the

most direct evidence of its usefulness. The three sections are devoted to Nursing, Medicine and Surgery, respectively. The book is written in simple English. It describes many of the common diseases to be found in tropical areas together with simple methods of diagnosis and treatment. In most cases reasons are given for procedures to be employed. The remarks are often lucid and vigorous, but sometimes they are sketchy and the explanations are insufficient. The historical section might be expanded. It is a pity to describe the bed and the formula for bed-making before there has been any introduction to the patient or any mention of his condition and his needs or the general responsibilities of the attendant to him.

There are details of how to fill in a temperature chart, but no mention of why people get fever or why it is important to observe its progress.

Considering the continued prevalence of malnutrition in Africa and the high infant and child mortality rates, more space might have been devoted to malnutritional diseases and to feeding and care of children. It is in the study of malnutrition and of children's ailments and their various causes that students learn to correlate living conditions with the diseases they produce.

Such considerations are doubtless introduced at many points into the clinical teaching. But their emphasis in a book of this sort would help students to realize their basic importance.

One of the gravest criticisms of British colonial policy is insufficient attention to the education and training of indigenous personnel. Dr. Trowell at any rate is one who has devoted much care and thought to this problem. The book is well printed and deserves its continued popularity.

Cicely D. Williams

Gomez Orbaneja, Jose & Garcia Perez, Antonio. **Lepra.** 387 pp., 105 figs. (1 coloured on pl.). 1953. Madrid: Editorial Paz Montalvo. [45s.]

The book is divided into 11 chapters. The first two describe the aetiology and general pathology of leprosy infection. Chapters 3 to 7 give a description of the classification, and details of the 4 forms of the disease: indeterminate, tuberculoid, lepromatous and borderline. Chapter 8, with 63 pages, discusses the diagnosis fully from every point of view. The last 3 chapters are devoted to treatment, epidemiology and prophylaxis. There are 4 appendices dealing chiefly with rules and regulations for the control of leprosy in Spain. A bibliography is added.

In the preface the authors set forth the objects of the book. Much has been learned recently of the clinical aspects and the relationships of the various forms, there is new light on the question of resistance, and new and more effective forms of treatment have made it more possible to control the disease and efface its effects. They feel that when so much progress is being made and so much interest taken in leprosy, both in Spain and in other Spanish-speaking countries, there is need for a book which will give the latest information on the subject. The authors may be congratulated on their success in carrying out the objects which they set themselves. The arrangement of the subject matter in chapters and sections of chapters, the logical way in which arguments are set forth, the clarity of the style and the appropriateness and clearness of the illustrations, make easy and pleasurable reading. Recent world-wide literature has been read and digested by men with personal practical knowledge and experience, and they have thus been able to put together within a convenient compass a remarkable degree of detail.

The method of arrangement may perhaps be best illustrated by reference to chapter 2, which deals with the general infection of leprosy. The penetration of the organism by the bacillus is first described. Next are considered the possible responses of the organism to the penetrating bacillus and the factors which influence these responses, and which may belong either to the organism or the bacillus. Age, sex, race, heredity, constitution, climate, food, intercurrent diseases and the standard of living are next fully discussed. This is followed by a section in which the various aspects of immunity are set forth. The chapter continues with a description of the pathogenesis of the various syndromes of leprosy, those of the skin, nerves, internal viscera, eyes, nose and throat, endocrines and lepra reaction. Lastly there is a section on the biochemistry of leprosy infection.

The book is well printed and bound, and of a convenient size. It should be of great value in Spain where a determined and well-planned campaign is rapidly bringing the disease under control, and also in Latin America and other Spanish-speaking parts of the world where leprosy is still endemic.

Ernest Muir

Simons, R. D. G. Ph. [Edited by.] **Medical Mycology.** pp. xiv + 446, numerous illustrations. 1954. Amsterdam: Elsevier Publishing Co. London distributors: Cleaver-Hume Press Ltd., 31, Wright's Lane, W.8. [55s.]

This attractively arranged book is composed of the reprinted sections on fungus diseases contained in the *Handbook of Tropical Dermatology and Medical Mycology*, under the same editorship [this *Bulletin*, 1954, v. 51, 1211], with an additional chapter on the history and development of medical mycology, and a collection of 39 photographs, 15 of them in colour, illustrating the macroscopic morphology, in culture, of the pathogenic fungi.

The international character of the work, conferred by its 36 contributors representing 10 different countries, is a particularly important feature in view of the limited geographical distribution of some of the more important mycoses. The descriptions of the various diseases are well balanced, brief and clear; emphasis is placed on the clinical aspect of the subject, with a rather pronounced dermatological bias, but the presentation is entirely satisfying. The descriptions of the mycology and treatment of the individual diseases are amplified by the chapters dealing specially with these matters. Particular mention must be made of the numerous photographic illustrations which, with few exceptions, are very good.

This book offers a simple introduction to the study of fungus diseases.

J. T. Duncan

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INDEX OF AUTHORS OR SOURCES

(The bracketed abbreviations after the page numbers indicate the subjects.
Page numbers within brackets indicate papers not summarized.)

Am.	signifies	Amoebiasis and Intestinal Protozoal Infections.	Lep.	signifies	Leprosy.
Bart.	,,	Bartonellosis.	Mal.	,,	Malaria.
Bl.	,,	Blackwater Fever.	Misc. Dis.	,,	Miscellaneous Diseases.
B.R.	,,	Book Review.	Misc. Pap.	,,	Miscellaneous Papers.
Chl.	,,	Cholera.	Oph.	,,	Tropical Ophthalmology.
Def. Dis.	,,	Deficiency Diseases.	Parasit.	,,	Parasitology: General
Den.	,,	Dengue and Allied Fevers.	Pl.	,,	Plague
Der.	,,	Dermatology and Fungus Diseases.	Rab.	,,	Rabies.
Ent.	,,	General Entomology and Insecticides: General Zoology.	R.F.	,,	Relapsing Fever and other Spirochaetoses.
Ep. Dropsy	,,	Epidemic Dropsy.	Reports, etc.		Reports and Surveys.
Haem.	,,	Haematology.	Sp.	,,	Sprue.
Heat Str.	,,	Heat Stroke and Allied Conditions.	Tox.	,,	Toxoplasmosis.
Hel.	,,	Helminthiasis.	Tryp.	,,	Trypanosomiasis.
Lab.	,,	Laboratory Procedures.	Typh.	,,	Fevers of the Typhus Group.
Leish.	,,	Leishmaniasis.	Ulc.	,,	Tropical Ulcer.
			Vms.	,,	Venoms and Antivenenes.
			Y.F.	,,	Yellow Fever.
			Ys.	,,	Yaws.

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GENERAL INDEX OF SUBJECTS

INDEX OF SUBJECTS

Page numbers within parentheses indicate papers cited by title only.

The subject index is arranged in the following divisions:—General index: Amoebiasis and Intestinal Protozoal Infections: Deficiency Diseases: Dermatology and Fungus Diseases: Entomology and Insecticides: Haematology: Helminthiasis: Mammalian and other Hosts: Tropical Ophthalmology: Typhus Group of Fevers: Venoms and Antivenenes: Book Reviews, Special Articles and Reports: Geographical index.

For most diseases, the arrangement is as follows:—(i) general material, (ii) distinct forms of the disease, (iii) the parasite or parasites.

See p. 1368 for the special arrangement of the index.

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AMOEBIASIS and INTESTINAL PROTOZOAL INFECTIONS

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DEFICIENCY DISEASES

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DERMATOLOGY AND FUNGUS DISEASES

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ENTOMOLOGY AND INSECTICIDES

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